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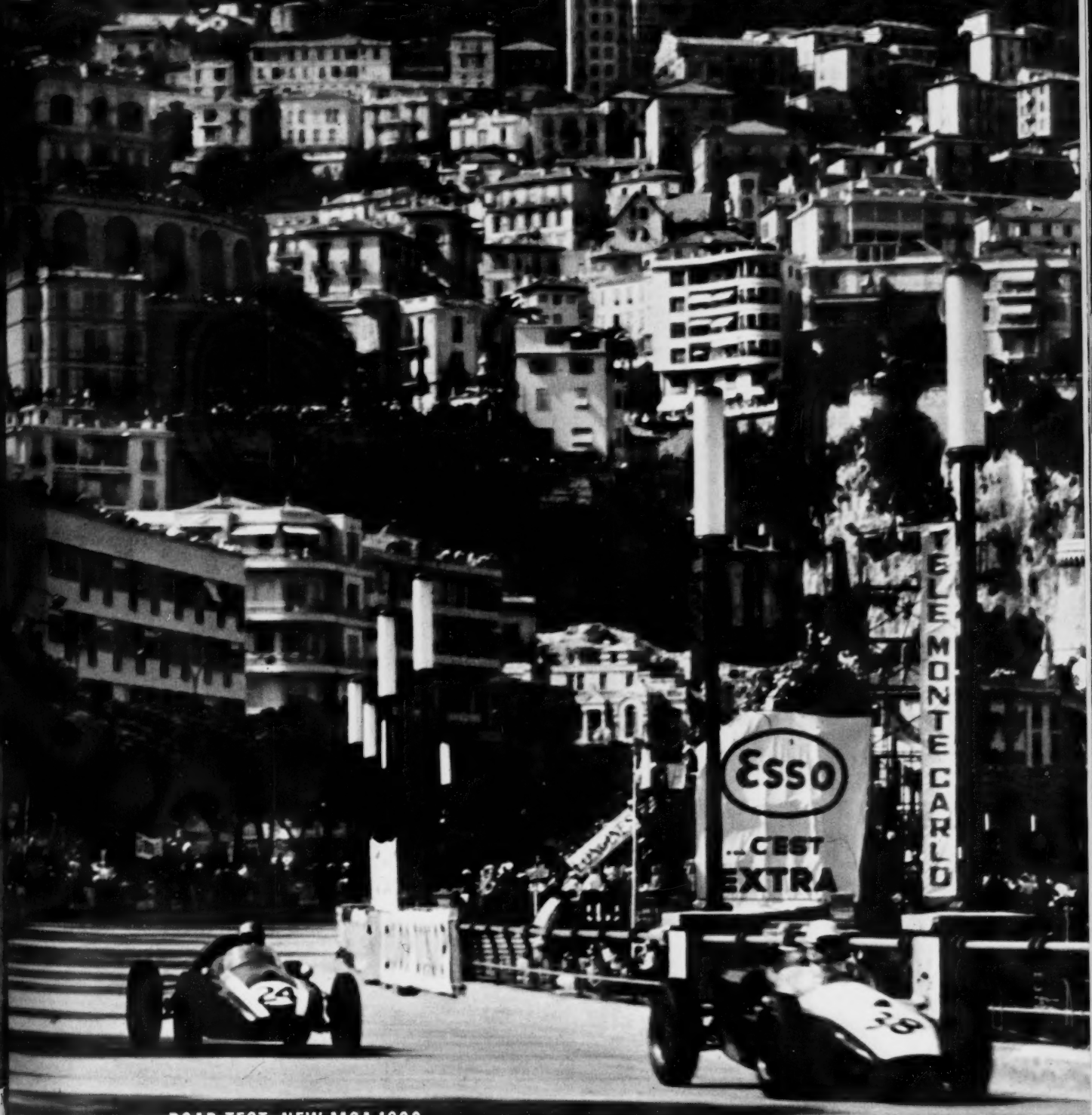

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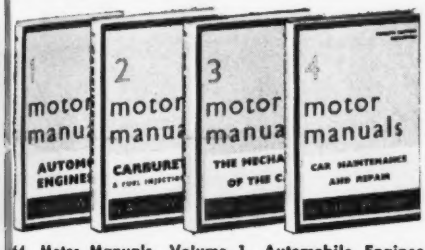

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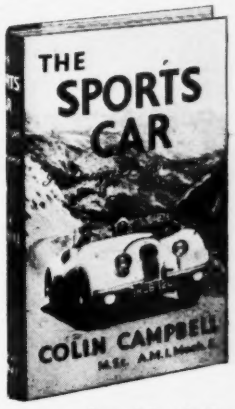

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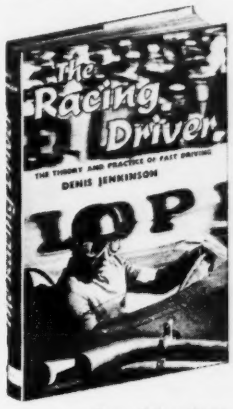

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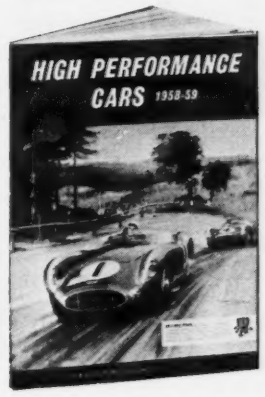

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Mr. ASHMORE introduced the following joint resolution; which was referred

H. J. RES. 476

IN THE HOUSE OF REPRESENTATIVES

July 28, 1959

JOINT RESOLUTION

Imposing an additional import duty on foreign-made automobiles and providing that the proceeds of such duty shall be used to augment the Highway Trust Fund.

Whereas foreign-made motor vehicles are being imported into this country in large numbers and at a rate which is increasing tremendously each year; and

Whereas the importation and sale of foreign-made automobiles is doing great financial injury to automobile manufacturers in the United States and is depriving many American citizens of their jobs and their means of earning a livelihood; and

Whereas the Highway Trust Fund, created for the purpose of carrying out the national defense interstate highway program, is showing a serious lack of revenues and is faced with the prospect that it will have to be delayed or drastically curtailed as a result; and

Whereas the imposition of a special additional duty on the importation of foreign-made motor vehicles would not only restrict the damage which such importation is doing to the American laborer and automotive industry but would greatly assist in financing the interstate highway program without the necessity of levying additional taxes on the already heavily burdened American taxpayer: Therefore be it

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That (a) paragraph 369 of the Tariff Act of 1930 (19 U.S.C. 1001) is amended by adding at the end thereof the following new subparagraph:

"(d) All the articles enumerated in subparagraphs (a), (b), and (c) shall be subject to a special duty of 7½ per centum ad valorem, which shall be in addition to any duty or tax otherwise imposed by this paragraph or by any other provision of law."

(b) The amendment made by subsection (a) shall apply only with respect to articles entered, or withdrawn from warehouse, for consumption, on or after the first day of the second calendar month which begins more than ten days after the date of the enactment of this Act.

Sec. 2. Section 209(c) (1) of the Highway Revenue Act of 1956 is amended by striking out the period at the end of subparagraph (G) and inserting in lieu thereof a comma, and by adding after such subparagraph (G) the following: "and amounts equivalent to 100 percent of the special duty received in the Treasury under paragraph 369 (d) of the Tariff Act of 1930."

► We've been wondering for some time now just when and how such legislation as the above bit of congressional nonsense would be proposed. And also thinking up some answers.

There isn't much we can say about or for Mr. Ashmore except that he represents some people in South Carolina and that it is very doubtful if any of Mr. Ashmore's constituents have been deprived of their jobs by the imported car industry. Quite the contrary, in fact. The dollar value of American cotton purchased by England alone is considerably more than the total dollar value of all the imported car trade. Since Mr. Ashmore's state is part of the American cotton belt it would seem that the good Congressman is doing his constituents a considerable disservice due to the fact that the income derived in foreign lands from their automotive trading comes right back home to purchase, among other goods, U.S. cotton, a fair portion of which very likely stems from Mr. Ashmore's constituency. So much for Mr. Ashmore.

It is also doubtful if much research went into Mr. Ashmore's ill advised proposal. The imported car accounts for about seven percent of the total U.S. automobile consumption which is a nice slice but hardly *(Continued on page 17)*

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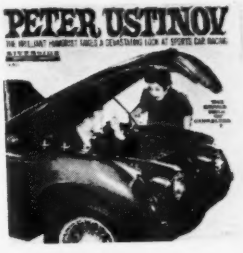

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letters

STIRLING vs ENZO

I have just finished reading the article about Stirling and Ferrari (SCI, July), which I enjoyed immensely. As far as he went Stirling told strictly the truth, too. The trouble is, he didn't go far enough.

Now, bear in mind I'm not criticizing the emotional background to his outlook. Stirling has a right, as do we all, to feel just as he wants. There are, however, missing facts:

Firstly, rather earlier than the Bari incident, Stirling went by the factory and had word sent to Mr. Ferrari that he was there and would like to try one of the cars but that circumstances forced him to hurry. Quite naturally this irritated the Commendattore considerably, so he kept Stirling waiting for over two hours and then sent him out with a Grand Prix car. Within a short time the engine was thoroughly broken, and Stirling was on his way to some other appointment. (*The engine was already "used", we understand. Ed.*)

About "Mimi," it might amuse you to know that I put a new set of plugs in the engine at Danville, raced the car and then drove it up here, where I ran it around generally before going down to Bridgehampton. Since it was running nicely, I left the same plugs in and raced the car twice. The car has since been used to get me from Seventy-seventh and Fifth down to Nineteenth and Ninth. She's still running enthusiastically on all twelve, so why mess with her?

It is amusing to note that she is now considered a modified car by the SCCA, presumably because her type is too fast. There can be no other reason since we can prove that over three hundred "Mimis", or more properly, "Berlinettas", have been built. The club claims that the engines in this series car differ from the specs as submitted for the 250 GT although they have never bothered to check that matter. If they ever do, they will find that the specs were sent for the Berlinetta cam timing and not for the standard Farina coupe as it was felt that clients would be unlikely to want to race the latter type of car.

In any case, I have now protested both the Aston-Martin DB-4 and the Jaguar XK150-S on the basis that neither have in actuality been produced (in sufficient number).

Yours for more confusion!
George Arents, Jr.
New York, N. Y.

PROPER CREDIT

People walk up to me and ask, "Hey Stan, when can I buy a 'VW Hammer' for my car?" I then repeat the same phrase "...only a matter of time, only a matter of time." The handy little accessory described in the July issue of Sports Cars Illustrated, page 72 is the one I am referring to. But the man to ask is the creator of the VW Hammer, Bob Cumberford,

who also wrote the text for the article. None exist now, but who knows, he might have created something for the Monsters (Detroit, that is.)

Stan Mott
Manhattan Beach, Cal.

INTERCONTINENTAL FORMULA

I have taken the opportunity of exploring this question of Inter-Continental Formula a little further, but I regret to say that we do appear to be at an impasse. Our manufacturers, as you are already aware, only seem to be interested in 3 litres for out and out racing machines. I think this is reasonably logical, as they have gained considerable experience in Grand Prix with the 2½ litre Formula, and to go any higher than 3 litres would perhaps pose difficult problems which would need more research and finance. Actually I am firmly of the opinion that all our present manufacturers would prefer the 2½ litre as at present, but it was with the intention of climbing up a little closer to the larger engined machine of the Americans, that the 3 litre was proposed. However, it does appear that they will not go too readily beyond this figure. We now know, (unfortunately from this point of view) that the Formula for Indianapolis for the next 3 years is to be 4.2 litres. This period of 3 years is understood by us to relate to some tax law concerning depreciation, and is therefore entirely understood, but it does mean that little can be achieved during this period.

Later perhaps, by sleeving and suitable modifications these engines could be brought down to 3.8 litres, but it still leaves the gap which would have to be bridged if we are to see Inter-Continental Racing in the future.

It is understood by us, of course, that the 4.2 Indianapolis is quite unsuitable for road racing, and furthermore we do feel that a car, even with this size of engine, and certainly of 5½ litres (even though such car could be built from existing iron blocks with push rod operation) would pose a completely new problem of safety as far as road racing is concerned.

It does appear therefore, that when the Formula changes we shall be left with this absurd French Formula, which may suit the French and Germans, but has no attraction to the engine manufacturers, nor do I think it holds very much from the point of view of Italy.

I feel however, that the Inter-Continental Racing which is scheduled for this year, both in Grand Prix and Sports Cars, is an excellent thing as it does bring together at these Meetings men with the same thoughts, and promotes most useful discussions which may ultimately bring about a solution.

Denis G. Flather
Sheffield, England

Mr. Flather is a member of the Royal Automobile Club's Competition Committee but he asks us to point out that these are his personal views, not those of the C.C.—Ed.

EUROPEAN NEWSLETTER

by Jesse L. Alexander

Baby Ferrari?

► Rumors have been circulating about a new 850 cc Ferrari engine. It is destined—so the story goes—for a new national Italian small-car project. A contemporary Italian automobile magazine—Four Wheels—seems to have a rational explanation for the wee Ferrari.

Their story on the tiny engine runs as follows: Ferrari has in the course of his development work built small-displacement engines of various types. The one under discussion here is an in-line four of approximately 850 cc. Overall length is about 18 inches. Its design makes use of experience gained with the latest two-liter Dino V6. This engine shares—with both the V6 and Colombo-type V12 — the chain-driven single-overhead-cam layout. At present writing there are two versions of the little engine. One uses a single double-bodied carburetor and delivers 62 bhp at 5800 rpm, while the other produces 80 horses at 67-6800 rpm from an additional twin-throat carb and other modifications. Ferrari is now debating whether or not to use this engine in a "Ferrarina". However, present production goals of one 250 GT per day and two Super Americas a month will keep the factory more than busy. For that reason the 850 may never become a production item.

BMW Progress Report

As the 1959 Frankfurt International Automobile show draws closer, design and development work on new models is reaching fever pitch in most German factories. No exception is the BMW works in Munich, where several promising new cars are in the gestation stage. Whether or not they can all be introduced is, as is well known, primarily dependent on finance, the 10 million marks forthcoming from the State of Bavaria not being deemed adequate both to maintain the plant and to introduce a major new model. The much-touted link with Rheinstahl AG remains a relatively tenuous sales agreement with Hanomag trucks.

Very certain to be introduced, however, is a new sedan edition of the BMW 600, to be rebodied in a more conventional idiom, to supplement the "700" two-seater already introduced.

Less definite will be the fate of the much-discussed 1600 cc car, dubbed the "530" by BMW. There's no doubt that when and if it does appear it will be bodied very differently from the much-photographed prototypes, the final shape being something of a cross between the Lancia Flaminia and BMW 507. The delays in its introduction have been caused only by the financial situation; mechanical development has been satisfactorily complete for some time.

In concept and appearance its engine is "genuine BMW". The oversquare proportions of the cast iron block are capped by an alloy cylinder head which carries a single chain-driven overhead camshaft. Vee-inclined valves are actuated by sturdy, short rockers mounted in the most modern and simple way. Down below are stiff rods and a five-bearing crankshaft which bring 7000 rpm within reach, while the dimensions are generous enough to allow easy enlargement to two liters when necessary. In standard trim, with an unusual intake system for smooth all-range performance, output may be 90 horsepower. A high-performance version, equipped with a separate carburetor throat for each cylinder, will deliver nearer 120 ps. BMW doesn't intend to build a full sports version just yet, but 120 horsepower should lend real Gran Turismo character to the projected 1000 kg. (2200 pound) car. Suspension will be conventional in general layout. In every respect, but especially in its engine design, the Type 530 impresses deeply by its sturdy and logical conception. If its never produced—a possibility that must be faced—the automotive world will have "lost" a great car.

Production of the V8 cars is to continue on a moderate scale as before, experiments with disc brakes of English manufacture having proven wholly positive. Of course output of the famed BMW motorcycles will also continue. An interesting side project has been the modification of an RS 500 cc engine for mounting in a late Cooper Formula III chassis, complete with five-speed gearbox. It should be fully as potent as a Norton installation, and much easier on the chassis and engine mounts.

Turbine Car Anyone?

Turbine research continues as a basic part of the Rover company's development program and there's no doubt in anybody's mind over here that Rovers will be the first people to offer a turbine car for sale. We visited their research department recently and were very impressed with what we saw there. Turbine engines are already being sold for commercial purposes; for example, one unit powers an auxiliary fire pump unit which can be carried to the scene of a fire by two men. The Rover turbine car has been seen on the roads of the English midlands in daily use as it undergoes further testing by factory technicians. Meanwhile, the 3 liter Rover is being factory equipped with disc brakes on the front and will be available in America in early 1960 with either a four speed gearbox or Borg-Warner automatic transmission. A full SCI road test of the Rover 3 liter is scheduled shortly.

Rumors, And Still More Rumors

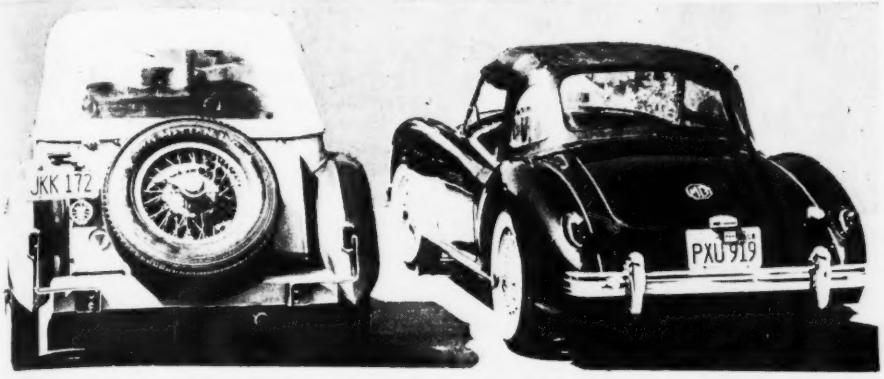
It is rumored that the Sunbeam Alpine will be available with a twin cam 1600 cc engine. The new English Fords soon to be announced will have many innovations—4-speed boxes for one thing—styling to be quite radically changed and with very little influence given to current American trends. Alfa is still rumored to be considering a 1600 cc Guilietta.

World Championship

Jack Brabham is well on the way to being World Champion driver for 1959; he now leads the championship with 27 points, following his victory in the British GP at Aintree on July 18. Second is Tony Brooks with 14 points. Brooks will now not only have to win the three (or possibly four) remaining Formula I events on the calendar but Brabham must not finish in any of these events to allow Brooks to consolidate his position.

(Continued on page 16)

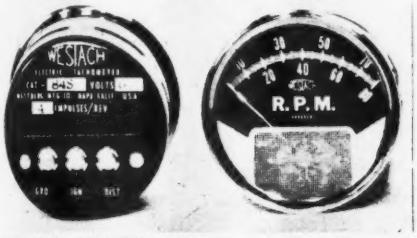
REPLACE THAT TATTERED TOP for only $29.95*



MG MITTEN TOPS are precision tailored for your specific car make, year model, series and body style. Complete, ready to install . . . Nothing else to buy. Trim and metal fittings included! Designed-engineered for perfect simple installation. No special skill or tools required. You can do it YOURSELF and turn out a professional job. Step by step illustrated instructions included shows you how! No sewing or alteration necessary. Cooperating directly with the world's largest manufacturer and designer of tops and tonneaus and bringing these straight to you means a tidy savings.

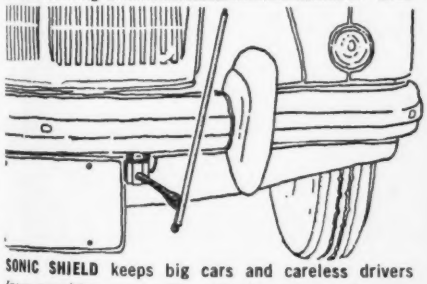
SMALL WINDOW STYLE. Complete top with back curtain for small window. Use glass and frame from present top when installing. For those cars not originally equipped by the car manufacturer with glass and frame, rear curtain is supplied complete with small size clear flexible plastic window sewn in; size same as car manufacturer originally supplied.

LARGE WINDOW STYLE. Supplied complete with large crystal clear plastic rear window; size same as originally supplied by manufacturer. Cars originallly not equipped with large windows the size is as big as entire back curtain. MG size is approx. 14" x 32". Window tested and approved for use in 48 states; folds down with top. Guaranteed not to crack, break or cloud-up.



8,000 RPM ELECTRIC TACH is guaranteed for one year also has guarantee of 2% accuracy. This 3" dia. instrument is quickly installed, will not affect ignition, has no drive cable or gears, is dust and moisture sealed and has indirect lighting. Suitable for all imported and domestic cars. Specify 6 or 12 v, no. of cylinders, whether positive or negative ground electrical system.

Westach Tachometer $34.00
Cowl mounting bracket..... 2.40



SONIC SHIELD keeps big cars and careless drivers from smashing your grille. Attaches to your bumper, connects to your horn (with one lead and one clip) and sounds the horn when activated by the presence of another car. Can be re-moved and transferred, quickly and easily..... $9.95

WINGARD INTERIOR REAR VIEW MIRROR is "Anti-Dazzle", has swivel base and telescopic adjustment, 5" x 2½' in size..... $5.95

WINGARD FENDER MIRROR snaps back into adjustment if it is hit or pushed. Finished in heavy chrome. Optically excellent, flat or convex..... $4.25

NEW "CLEAN UP" MATERIALS
Although we suspect that the first automobile polish was invented about 30 seconds after the first automobile, someone is always coming up with a new and better cleaner, polish, or restorer. Lately we have happened upon four excellent products that we would like to recommend. (Note: our appraisal of all clean up materials is based on actual use in preparing our cars for concours.)

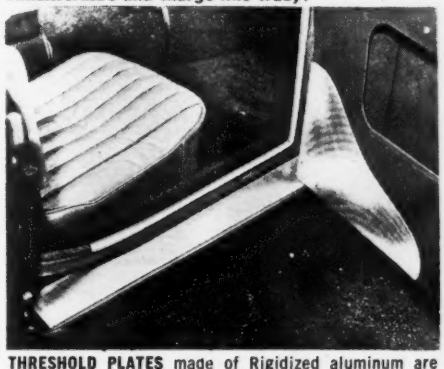
CAR-FAB, a new chemical cleaner for rugs, upholstery. and fabric tops. Harmless to plastic, cloth, leather, easy to use and highly effective. 1 lb. can..... $1.50

MEGUIARS PLASTIC CLEANER approved by U. S. Air Corps for use on canopies, etc. the best. 8 oz..... $1.85

OMEGA SPRAY CLEANER for easy removal of grease and grime from engine and wire wheels. Bomb can.... $1.95

CROM-NU rust remover and chrome polish. Does not erode the plating. Big 5 oz. tube..... $.98

MONEY IS OUT OF STYLE AT MG MITTEN . . . SO. CALIF. RESIDENTS CAN JUST BRING IN THEIR BANK AMERICARDS ***and charge like crazy.***



THRESHOLD PLATES made of Rigidized aluminum are an attractive and practical accessory. Do away with frayed and hard to keep clean rugs in this "in & out" area. For Porsche, Triumph, Alfa, Sprite, MGA..... $4.95

AND NEVER DARKEN MY DOOR AGAIN (after you install these aluminum Kick Plates). Very attractive, protect door panels from unsightly marks and tears inflicted by high heels, or rubber soles and heels. For MGA, FR, Healey, Porsche, Sprite..... $4.95

AMCO TONNEAU COVERS keep the interior of your car looking like new. Tailored from the best vinyl coated fabrics, each is carefully finished and fitted with a heavy duty Talon zipper. Can be used with one side fastened. Colors: Black, White, Tan.

MGA, Sprite, Berkeley..... $19.95
MG TC, MG TD, MG TF..... $29.95
Austin-Healey 100, Jaguar XK120,
XK140, Triumph TR-2*-3*..... $31.95
Porsche (specify: top on or off), Alfa-Romeo..... $34.95
Austin-Healey 100-Six (2 seater)..... $39.95
Austin-Healey 100-Six (4 seater)..... $42.95
Mercedes 190SL..... $44.95
*Tenax Fasteners if needed..... 50¢ ea.

*If you own an:
MG TC, TD, TF,
Austin-Healey,
Triumph, Jaguar,
Corvette,
Morris Minor,
Hillman,
Volks Convertible

MGA 3-WINDOW STYLE..... $33.95

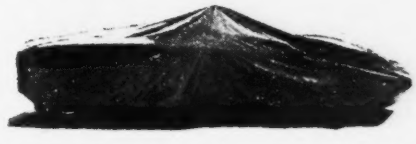
Hi there! Well, it's top time again and if you've had yours folded up all summer, there's a good chance that it has developed an unsightly and impractical appearance. If so, you should replace it at once with one of our do-it-yourself top kits . . . and save all kinds of money. It's easy. The simple instructions are so clear that even I can follow them and no special tools are required. You have a choice of two superb materials. The $29.95 ($33.95 for MGA 3-window) model is tailored from 3-ply de luxe fabric. Also available, cut to the same precision patterns, are tops in Best Super Vinyl at $43.75 for the cars listed above and $46.88 for the MGA triple window style. You would expect to pay up to $100 for a new convertible top at a good shop. Why not do it yourself and pocket the difference.

3-PLY DELUXE FABRIC has 18 month written guarantee against breaking or cracking. Made from the finest pre-shrunk cotton fabrics with 8 coatings of adhesive rubber bonded into the layers, these tops will always be good looking and waterproof.

BEST SUPER VINYL has a 3 Year written guarantee against all defects, cracking or shrinking. This material is highly resistant to tearing, can be washed with mild soap and water so that it looks like new for years.

TOP ORDERING INSTRUCTIONS

1. Specify exact car make, year, model and body style.
2. State quality; Deluxe or Best Super Vinyl.
3. Specify color choice. White and Black available with either a Black or Tan inside; Tan has Tan inside.
4. State style desired.



People who have never made a practice of keeping their cars covered with one of our famous tailored-to-fit Mittens just don't take advantage of the money-making possibilities inherent in them. By protecting the finish, chrome, interior leather, plastic or wood and fabric tops, the careful owner puts considerable extra loot in his pocket at trade in time. Unless you plan to have your transportation buried with you like Egyptian Kings, get a Mitten now.

	Lightweight Sun and Dust Cover	DURICON Water Repellent
☐ MG Mitten ☐ Healey Hugger ☐ Alfa Apron ☐ Fiat Frock (1100TV) ☐ Sprite Spat	$17.95	$24.50
☐ Morris Muff ☐ Renault Romper ☐ Ghia Gown ☐ Porsche Parka ☐ Peugeot Pegnoir ☐ Minx Muff ☐ Fiat Frock (600) ☐ Saab Sack	$22.95	$29.50
☐ Corvette Cap ☐ Thunderbird Tepee ☐ Jaguar Jacket (140, 150, 3.4) ☐ Mercedes Muff (190, 300 SL) ☐ Volvo Vest	$27.95	$32.50
☐ Vest for Volkswagen	$22.95	$29.50

ORDERING INSTRUCTIONS.
We pay postage if you send money with order. C.O.D.'s take 25% deposit. Calif. residents also owe 4% Sales Tax. Money back if not satisfied. Write for free, colorful catalog of sports car items. No charge or obligation.

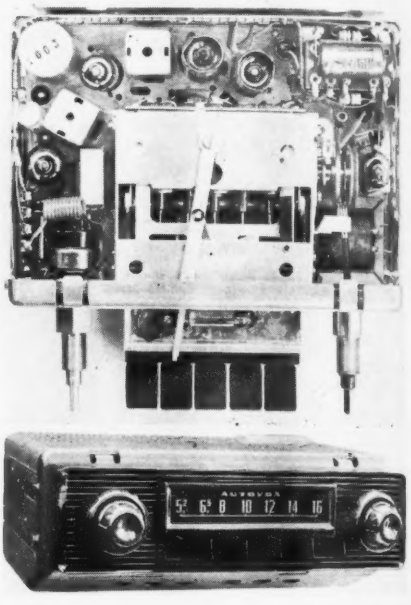
MG Mitten

P. O. Box 4156 Catalina Station Pasadena, Calif.
Dept. S-10 1127 East Green St. Pasadena, Calif.

new products

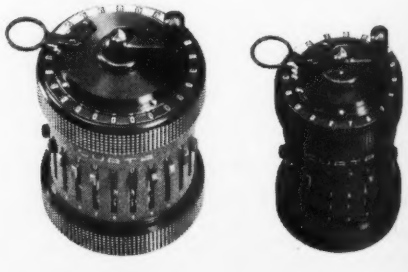
A one-piece lounging suit is being sold by Jere's Ltd., 821 Fremont, Fort Myers, Florida. The suits are available in corduroy or polished cotton in small, medium, large and extra large for men, and sizes 10, 12, 14 for women. A full-length zipper, stretch waistband and a choice of short or long sleeves are features. $18.50 in cotton, $19.95 in corduroy, add $4.00 for long sleeves.

Long a supplier of specially designed radios for Fiat automobiles, Autovox S. P. A. of Rome has now made available for the North American market a complete line of auto radios. Transistorized and compact, the line features standard American components to facilitate servicing. For information write to the Autovox Corporation of America, 250 W. 57th St., New York 19, N. Y.



If you have been bothered by leaking side screens in wet weather and excessive wind blast in good weather, the new replacement Triumph sidescreens may be just the ticket. Marketed by Bakers Worldwide Auto Parts, Inc., P. O. Box 57, Franklin Square, N.Y., these screens feature dual sliding panels for ventilation, with the added ability to remove only the top portion of the screen in order to keep drafts, dust and splashes from coming in over the deeply cut doors. Durability is insured by the use of acrylic (Plexiglass) panels and all aluminum construction.

The CURTA Calculator is a precision instrument that performs all types of mathematical computations — addition, subtraction, multiplication, division in addition to squares, cubes and square roots. Designed originally for engineers, contractors, etc., the calculator was discovered by sports car rallyists and is now available to them through the Feldmar Watch Company, 8971 West Pico Boulevard, Los Angeles 35, California. The De Luxe model is shown on the left, and provides fifteen places in the answering column. The Regular model has eleven places and is slightly smaller in size. Price for the Regular model is $125.00, including standard instructions plus special instructions for use in rallies.



SIMPLEX *Challenger* RACERS

No other racing Karts offer all these features as standard equipment for $189.00 and $269.00 delivered.

SIMPLEX *Challenger*	MARK I	MARK II
Standard retail price	$189.00	$269.00
INCLUDES		
Crated	Yes	Yes
Freight paid	Yes	Yes
Chassis completely welded	Yes	Yes
Painted-baked enamel	Yes	Yes
TYPE BRAKES		
Finest automotive two shoe internal expanding brakes	Yes	Yes
Internal band brake	NO	NO
External spot brake	NO	NO
Scrub on tire brakes	NO	NO
STEERING		
Diameter-kingpin	½"	½"
Aircraft type fittings	Yes	Yes
Shakeproof fasteners	Yes	Yes
Precise turning radii	Yes	Yes
Wheel size	5"	5"
Tapered roller bearings	Yes	Yes
Fully pneumatic tires	Yes	Yes
Hub caps (keep out dirt)	Yes	Yes
Foot brake pedal	Yes	Yes
Foot accelerator pedal	Yes	Yes
Replaceable axles	Yes	Yes
ENGINE: choice of		
Lauson 4 cycle 2½hp.	Yes	Yes
Clinton 2 cycle 2½hp.	Yes	Yes
Dry air filter	Yes	Yes
Rewind starter	Yes	Yes
All chain drive	Yes	Yes
Front bumper	Yes	Yes
Automatic clutch (s)	Yes	Yes
Seat side rails	Yes	Yes
Full length floor pan	Yes	Yes

Seat and back cushions are the *only* extra on these cars. Cost 9.85

DEALER INQUIRIES INVITED

PROVE IT YOURSELF—check all other Racing Kart claims and their extra costs against this list.

SIMPLEX MARK I
Challenger Racer

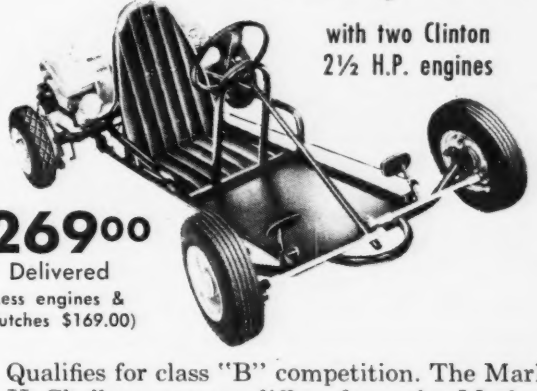
with Clinton 2½ H.P. engine

$189.00
Delivered
(Less engine & clutch $139.00)

Qualifies for class "A" competition. Designed by Bill Muller former Indianapolis race driver. Chassis and component parts are of such outstanding quality and workmanship they are easily capable of withstanding racing stresses of 100 mph plus when and if such speeds are attained by racing karts.
(available with Clinton 6 H. P. engine)

SIMPLEX MARK II
Challenger Racer

with two Clinton 2½ H.P. engines



$269.00
Delivered
(Less engines & clutches $169.00)

Qualifies for class "B" competition. The Mark II Challenger racer differs from the Mark I only in that it comes equipped with dual brakes, dual rod controls for the foot throttle and dual engines.
(available with two Clinton engines totaling 12 H. P.)

Send for FREE literature and name of nearest dealer.

SIMPLEX MANUFACTURING CORP. Dept. S 1
540 North Carrollton • New Orleans, La.

DETROIT NEWSLETTER

by Mike Davis

► What's in a name, or who's on first with Falcon. Don't believe the report published in some New York papers that Ford beat out Chrysler by 20 minutes for the name Falcon for their respective compact cars. Chrysler had established both "Falcon" and "Golden Falcon" as early as 1954 for special show cars.

Henry Ford II personally called Chrysler's Tex Colbert one morning last winter to confirm that Chrysler had prior rights to Falcon. (Legally, you have to build a car bearing such a name and carry it across a state line . . . Chrysler had done this for the 1955 New York Auto Show.) Apparently, Chrysler readily gave up Falcon, perhaps to repay a favor or gain one for the future.

Sales-types are having second thoughts about "Valiant", the tag finally adopted for Chrysler's 106.5 inch wheelbase offering. Seems they feel the appelation implies a defensive position. Chrysler's well satisfied with "Dart", the name selected for the fourth new arrival on the domestic scene, though. The feeling is that Dodge Dart, which Dodge dealers will sell in place of the Plymouth, gives an impression of speed, efficiency . . . and compactness, which the car really won't have, though the advertising will probably claim it does. It'll have a 118-inch wheelbase and a new 140 hp OHV 6 of about 230 cu. in. (same as the present L-head 6), just like the '60 Plymouth.

Backward glances: One of the labels Chrysler considered for the small car, but turned down, was "Tempo".

Some GM publicists are not happy with "Corvair" for the small Chevy. The name, easily compounded from Corvette and Bel Air, has been turning up all too often in print as either Corsair, one of Edsel's 1958 series, or Convair, the airplane maker.

Going back to the Falcon for a minute, there's rarely anything new under the sun. German auto makers used the name as early as 1906, and again in the 1920's. Riley and Jowett used it for cars in the mid-thirties, and Humber for a "public service vehicle" in 1958. In the U.S., the record shows a three-wheeled Falcon in 1913, the Falcon-Knight in 1927, and most recently the Willys Aero Falcon beginning in 1952. There was also a Willys Aero Lark and Aero Eagle. While we're on the subject, don't forget that the Willys Aero, Henry J and Hudson Jet were compact cars that died before George Romney made them fashionable with the Rambler.

Two obvious ones, and then we'll leave names to tombstones: when Studebaker-Packard introduced the Lark last year, promoter Jim Moran was hired to help with the tub-thumping. Someone recalled that he was the guy who sold a refrigerator to an Eskimo, sat on an ostrich egg and pulled other odd-ball stunts. At that, a wag popped loose with: "What! Sat on an ostrich egg and hatched a Lark?" So around Detroit these days they're saying, "Hope Ford's Falcon doesn't lay an egg."

GEAR DUST AND AXLE DRIPPINGS . . .

The return to the floor mounted shift introduced by Chevy in the '54 Corvette and pounded in with the 4-speed '59 standard Chevy stick, turns out to be more prophetic than you'd think. Insiders say this will be a feature of perhaps two of the small cars, and of other special sports jobs such as the special '59 Pontiac, dubbed "Supercharged 400" spotted one day in a corner of the Pontiac Motor Div. executive garage.

The "400" hides in a white Bonneville convertible with headlights disappearing behind a black wire mesh grille. Twin exhausts poke out of the *sides* of the rear fenders. It has bucket seats, a 4-speed floor mounted stick and another stubby lever on the hump which we took to be either a cut-out or a European-type hand brake. Could well be a prototype for a new offering in '60.

Pontiac's general manager, Bunky Knudsen, also has his own '59 Pontiac El Camino-like pick-up, incidentally.

The Corvair, Falcon and Valiant will all be shown to the public in October. The fly in the ointment, however, is that only Corvair will have enough production to supply dealers with much they can sell before Christmas. Look, but don't touch, in other words . . . unless you want to rent one. Hertz says it will buy 4,500 of the leetle ones before Jan. 1. In fact, we predict demand will be so great there will be a waiting list at most dealers for the small cars until April or so.

Chrysler has worked many miracles to bring out the Valiant this soon. Whereas GM made the go-ahead decision in the fall of '57 and Ford in January '58, Chrysler couldn't get the lead out until August of last year. Originally, the Valiant was scheduled for spring '60 introduction, then January, then December, then November and finally October . . . whew!

Production of the Corvair began in early July at Willow Run, outside of Detroit. Ford's Falcon took to wing in August at Lorain, Ohio, and the old Dodge plant in Hamtramck, Mich. (a city surrounded by Detroit) began turning out Darts and Valiants right after Labor Day. The Falcon and Corvair will also be assembled in Kansas City and California, but Chrysler cautiously plans to stay inside Detroit.

SLINGS AND ARROWS . . .

You'll never hear the end of the admen's rock-throwing, pro and con rear-engined cars. Ford started it going in April with a TV commercial showing an archer shooting arrows: the one with the weight at the front went true to the target; but with its weight near the feathers, the other went astray. Hence, said the pitchman—suitably garbed as a physics professor—rear-engined cars "except for the very smallest" were hard to keep going straight.

Chrysler's Colbert got into the act a few weeks later with a crack to newsmen that the Valiant would have the engine "up front where it's supposed to be."

Up to this time, General Motors couldn't—or wouldn't—defend itself, since it had yet to acknowledge a small car of any configuration being under way, much less one with a "radical" rear engine.

Apparently the guff got too great for even old General Money—er, Motors. Chevrolet Division hauled out Maurice Olley, a former engineer now consulting, to talk about a "hypothetical rear-engined car." No mention was made during the press conference about any Corvair . . . no, siree, this was just a hypothetical car Olley wanted to talk about.

Anyway, this hypothetical car turned out to have:

1) A rear-mounted, air-cooled aluminum "flat-six", weighing about half as much as existing V-8's, in a compact unit with the transmission and drive gears. High gear drive would be direct. (Sound familiar?)

2) A body of integral construction with a flat floor.

3) An unloaded weight of about 2,400 pounds, with a 40/60 weight distribution.

4) Coil springs and individual rear swing axles.

5) Thirteen-inch wheels, on which would be mounted new type "low-profile, long cord" tires.

6) An air-flow heater which gives instantaneous heat.

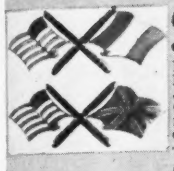
Olley told auto writers that the above hypothetical car, hereafter known as "H" for the "Holden project" under which it was cloaked, *theoretically* overcame the oversteer, of which its type is accused, by a trick of tire inflation. The new shaped tires should be filled to 26 pounds in the rear and only 15 in the front, he revealed. This, in combination with the other features, would produce "the desired margin of understeer."

Ah-ha, but the opposition was not to be put down so easily: Some low scoundrel discovered a paper Olley had given to the S.A.E. six years before, in which he condemned rear-engined cars, and mysteriously, anonymous reproductions began turning up in auto writer's hands. (P.S. The tire pressure thing is what made him change his tune.)

And within days, American Motors' Romney and Chrysler's Simca were pouring front-engine oil on the flames. At least GM will be able to come out of the shadows to do its fighting when the Corvair is revealed in all its splendor. If you read Rambler ads carefully, by the way, you'll notice AMC is trademarking "compact car." Other Detroit hucksters say the ploy won't work—the term is generic, and

(Continued on page 18)

racing and sports car accessories



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Exclusively designed for us. Executed in full color. Jewelers Enamel and beautiful Chrome Finish. Complete with mounting screws. Your choice of: USA—Gt. Britain, USA—France, USA—Italy

$3.95 ea. ppd.

Jacket Emblems

$1.00 ea. ppd.

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Made for: Alfa, Austin Healey, AC, Corvette, Jaguar, Ferrari, TR, MG, Mercedes, Fiat, Renault, Porsche. We also offer Racing Team and Crossed flags & Helmet 3" patches at $1.00 ea. (Also Porsche 4" at $2.00 ea.)

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To be sewn on back of racing suit or jacket. Made for: Jaguar (blue, red, black on white); Morgan (red on white); Corvette (authentic colors); Mercedes (white on blue); MG (red, black, blue on white); Porsche (red on white); Austin Healey (red on white); Fiat (blue on white); TR (blue on white); Alfa (authentic colors).

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DRIVING GLOVES

$7.95 per pr. ppd.

RACING GLOVES (Shorties)

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Non-Slip Grip—In Skin Soft Italian leather, well ventilated, double leather palms. Four distinctive styles (except Shorties) in all sizes, including very small and very large: your choice of all black; tan and natural brown; white leather back and tan palm; knit back and brown palm. SHORTIES in knit back and brown palm only. Sizes: 6½-10 inclusive for ladies and gentlemen.

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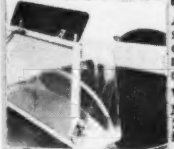
amco WIND WINGS AND SUN VISORS FOR DRIVING COMFORT



All "Amco" wind wings and sun visors have highly polished edges—Fittings are made of machined brass, triple chrome plated.

WIND WINGS

MGA—MG—TC—TD—TF—Triumph 2 & 3, Berkeley, Fiat 600/1100—Sprite. **$16.95 set ppd.**

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MGA—MGA CPE—MG—TC—TD—TF—Triumph 2 & 3—Austin Healey 100/6—Berkeley—Sprite **$6.95 ea. ppd.**

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in: White, Grey, French Racing Blue, Red or Black

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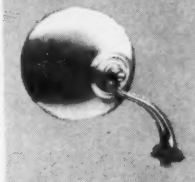
Racing Mirrors

"Raydyot"

Shatterproof mirror in your choice of flat or convex glass mounted in streamlined spun aluminum cone housing (5¾ oz.). Adjustable base with positive locking device. Recommended for cowl mounting.

$5.95 ea. postpaid.



"RAYDYOT" Universal

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THE WELL KNOWN DERRINGTON

Racing Steering Wheel

$50.00 postpaid

State make, year, model of car. AH, Jag, MG-A, TC, TD, TF, TR 2 & 3, AC, Corvette, Porsche, Aston-Martin, Alfa Romeo 1300 only.

Duralumin one-piece frame with rim made in contrasting laminations of light African Obeche wood and rich dark Mahogany. Hand French polished, finger serrations for a much more firm grip. This wheel is slightly smaller in diameter (16") and allows an ease of handling not experienced with stock wheels. No driver who has tried one has ever failed to express his enthusiasm for the distinctive Derrington wheel. The purchase price includes all necessary fittings. (Corvette 17" Dia.)

MONZA

Quick Filler

GAS CAPS

$22.95 ppd.

As the name implies these are authentic Monza type quick filler gas caps with large 3½" throat diameter, 5" overall diameter. This is a basic necessity for drivers of competition and sports cars. Light alloy construction. Complete with sleeve. Rugged use invited and of course, Monza feature of spring-loaded gas seal.

Also Avail. 2¼" throat **$16.95**, 2½" throat **$18.95**

FLAME PROOFING $1.50 per can (add 25¢ postage). Flame proof your cotton, silk, linen or wool suit with "Official Flame-Proof Chemical's" No. 55. Spray or dip. Carries State Fire Marshall's approval.

BELL 500 TX RACING

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New energy absorbing non-resilient liner as specified by the Snell Fund Study. This study conducted by Geo. G. Snively, M.D. is the first comprehensive racing crash helmet test ever made in this country. *Licensed by Topex.

Helmet with visor **$38.50** postpaid, less visor **$37.00** postpaid. Sizes: 6¾" thru 7½".

BELL "500TX" BUBBLE SHIELDS

Made of non-inflammable plastic. Are streamlined and shatter resistant. Tested at over 200 mph and gives undistorted vision.

	SNAP-ON	FLIP-UP
CLEAR BUBBLE SHIELD	$4.95	$7.95
CLEAR with SUNSHADE	5.50	8.50
TINTED BUBBLE SHIELD	5.50	8.50
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*FLIP-UP model comes in two sizes: SMALL, for BELL "500TX" Helmets up to and incl. size 7; LARGE, for BELL "500TX" Helmets sizes 7⅛ and larger.

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European newsletter

(Continued from page 10)

New Cars

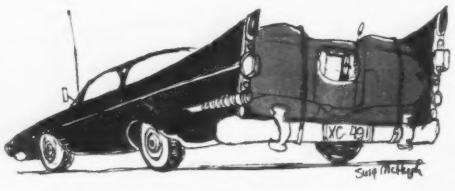
Caught entering the Continent by one of our eagle-eyed new-car scouts—the latest in a long line of Austin baby cars. Designed to replace the Austin A-35, the new little car follows the Farina styling adopted by all the sedans in the BMC series. No doubt powered by the BMC "A" engine—used in the Sprite, Morris Minor and A-40—it should fill the gap left by the demise of the pre-war Austin Seven.

The recently announced Austin A99 Westminster occupies the exact opposite end of the Longbridge firm's price range from that to be enjoyed by the baby car. Powered by the BMC six-cylinder "C" engine which has been suitably de-tuned to give 112 hp as opposed to the 130 produced by the same power plant in Austin-Healey 300 tune. To cope with this three liters-worth of urge, Lockheed disc brakes have been fitted to the front wheels of the new luxury sedan. The Westminster—which replaces the A105 in the Austin line—will be available with three-speed manual transmission incorporating a Borg-Warner overdrive, or, as an optional extra, a fully automatic gearbox.

To hand as this is being written are the factory photographs (see Newsletter for September for very unofficial pictures) of the Sunbeam Alpine. The production version looks little changed from the test car. Quoted power is 83.5 bhp at 5300 rpm.

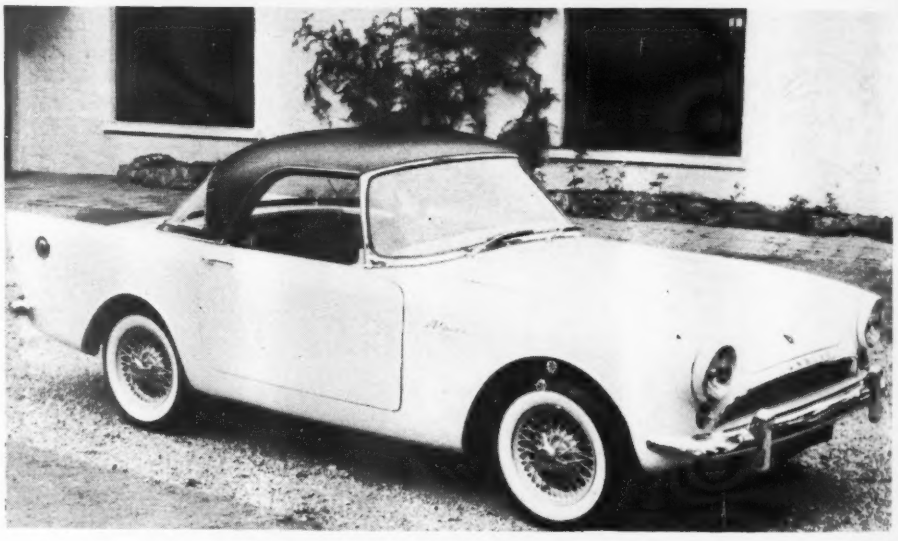
A variation on an existing theme is the four-door Rekord sedan recently introduced by Opel. Of more interest to "Press On Regardless"-type drivers is the new Rekord engine that produces 63 bhp—or 11 more than the old engine.

From the old-line French Panhard company comes news of a face-lifting operation on their early post-war Dyna design. The new body treatment achieves the desired effect—it makes it possible to separate the new PL 17 from the older Dyna models at a glance. The mechanical changes in the new Panhard are of greater interest, however, than the fudging about with the exterior lines. An optional 48 bhp engine—called the *Tigre*—a stronger 4-speed gearbox, and aluminum brakedrums with iron liners make the new Panhard a still more interesting car to drive. Note to big game hunters: the *Tigre*-engined versions of the PL 17 are upholstered in genuine imitation tiger skin.



New Austin baby cars wait in warehouse for delivery to Continental dealers.

Both fuel injection and a twin-cam engine have been rumored for new Sunbeam.



Alfa's new Giulietta Sprint Speciale re-affirms the position of Italian coachbuilders as leaders in the field. Car was recently demonstrated to motor journalists at Monza Autodrome in Italy.

Yes, that's tiger skin on the dashboard.

(Continued from page 6)

enough to create a depressive influence on the industry which supplies the other 93 percent of our automotive needs. Depressive influences in Detroit are largely self-inspired. Retooling for new models is one major and recurring cause—there is always a mass lay-off when the big companies shut down in preparation for new production. In those years when sales are truly off, such as in 1958, and production is, perforce, down, there are usually several reasons, all home-grown. One is overselling the previous year — everybody has a new car so why buy another one? A second reason is that on occasion Detroit goofs and produces a group of products that people just plain don't want or it continues a previously successful trend to the point where it is run into the ground — *Bigger, wider, lower, longer* is a good recent example. A third reason is trouble in an allied industry or in an industry upon which the large mass of consumers rely for their living and for their "new car money." A prolonged steel strike could do the job quite nicely — when a man is on strike rations he isn't in the mood to finance new cars. Nor is the local merchant who depends on the striking worker for *his* income. Nor is the man who works for the local merchant. Nor is the man who works on a production line which may be shut down for lack of steel. The idea that the loss of seven percent of the automotive market to imports can have the recessive influence of a steel strike or a period of overselling is patently ridiculous.

Also, the Highway Fund derives a good percentage of its income from Federal taxes on the automobile and on its use and on the fuel and oil it uses. It is demonstrable fact that sports car and imported car owners drive more and, in the mass, use more gasoline, oil, tires and anything else that bears a Federal tax. Restricting the purchase by Americans of foreign cars through prohibitive tariffs can actually cost money rather than gain it. Filling one pocket at the expense of the other is just plain bad business.

Finally, one of the biggest tax burdens we carry, outside of national defense, is the foreign aid program, much of which is in the form of outright gifts and outright loans in cash. The automobile industry is the mainstay of those countries into which we do NOT shovel cash in foreign aid for the simple reason that they are self supporting due to that automotive industry. Were we to hamper that industry or cripple it our foreign aid would be very likely to rise. The question is a simple one: Do we act as customer and seller in a concord of free nations or do we go back to being the rich (and unpopular) uncle or relief agency handing out dole? There's also a corollary question: Should a congressman be allowed through ignorance to ruin or hurt a retail industry built by thousands of American small businessmen, as industry that supports other thousands of Americans and gives still other hundreds of thousands of Americans more pleasure than anything else they've ever enjoyed?

Perhaps your congressman can tell Mr. Ashmore what you think. But he won't know what to tell Mr. Ashmore if you don't tell *him*. So write. —*john christy*

Detroit Newsletter

(Continued from page 14)

besides, "there are lots more words in the English language".

REFRESHER COURSE ON SMALL CAR STATISTICS . . .

Corvair—108-inch wheelbase, 180 inches overall length, 68 inches wide, 52 inches high; engine, 141 cubic inches, 92 hp, top speed around 90. Will offer 3-speed stick or modified Powerglide.

Falcon—109.5-inch wheelbase, 181 inches overall length, 70 inches wide, 54 inches high; engine, 144 cubic inches, 86.5 hp, cast iron OHV 6, speed around 85. Dual headlights may be offered as an option. List price, F.O.B. Detroit, for a two-door sedan, $2,047, unless Ford reduces the standard dealer discount, which might knock it down another $100. Simplified and cheaper (!) Fordomatic or stick.

Valiant—106.5-inch wheelbase, 183 inches overall, 69 inches wide, 54 inches high; engine, 170 cubic inches, 110 hp, canted to one side (like the 300 SL) to lower the hood line, OHV 6 originally in cast iron but switching to aluminum later, top speed around 95 and very snappy 0-60. A new automatic transmission—including a parking gear which Chrysler has never had in any of its automatics—plus many other innovations. Body will be fully integrated, not "stub" like the Plymouth, Dart, Dodge, DeSoto and Chrysler. Will be the only Big Three compact car to offer initially a station wagon.

AMONG THE BIG BOYS . . .

Buick, Olds, Pontiac and Cadillac should have improved automatic transmissions, smaller for less "hump" and designed to become transaxles in '61.

Imperial will offer electro-luminescent panel lighting and a new type electrical system, but will not have integrated body like the other Chrysler products. The European flavor will be evident in some of the '60 Chrysler models, especially the 300 F, which will not bow until January.

Plymouth has given up the Sports Fury as a super-speed job for '60, but none of the Chrysler cars will be exactly sluggish.

Edsel will share Ford's sharp new body shell, but shows its medium-price kinship with Pontiac in the snout. Mercury, which had a new body shell in '59, will have a *waist*-lift. Lincoln and T-Bird get their hair combed.

GMC Truck is introducing three V-6's and a V-12 this fall. The V-12 is a monster 702 cubic inches, and the first gasoline V-12 turned out on a production line since the 1948 Lincoln mill. The V-6's represent first U.S. efforts in this direction, Italy having such units in the Lancia and Ferrari Dino. Both Chrysler and American Motors have messed with V-6 jobs, but apparently gave up any thought of dishing them up for public consumption. GMC will also offer Detroit Diesel Division's new line of V-4, V-6, V-8 and larger iron *or* aluminum diesel power plants. The V-4 is adaptable to taxi or small truck usage.

FINALE . . .

Report of a Ford spy back to Dearborn after he'd seen the 1960 Chevrolet: "It's been face-lifted one year backwards."

coming events

DATE and EVENT	LOCATION
Sept. 12-13 Chicago Region— SCCA National	Elkhart Lake, Wis.
Sept. 12-13 New York Regional Race (SCCA)	Bridgehampton, N.Y.
Sept. 13 Northwest Regional Race (SCCA)	Shelton, Wash.
Sept. 13 Southern Illinois Region (SCCA) Peabody Preakness Gimmick Rally	
Sept. 13 Grand Prix of Italy	Italy
Sept. 13 Echevannes Hillclimb	France
Sept. 18-21 Viking Rally	Norway
Sept. 19 F-2 and sports car races	Oulton Park, England
Sept. 19-20 Ghana Rally	Africa
Sept. 19-20 Chicago Region, Michigan Miglia Rally	
Sept. 19-20 Gulf Coast Regional Race (SCCA)	Dothan, Alabama
Sept. 19-20 Los Angeles Regional Race (SCCA)	Del Mar, Cal.
Sept. 19-20 New England Region (SCCA) 4th Annual Gaspe Rally	
Sept. 19-20 USAC Sports Car Race	Marlboro, Md.
Sept. 26-27 Watkins Glen National Races (SCCA)	Watkins Glen, N.Y.
Sept. 26-27 Continental Divide Nat'l Rally Colorado Region (SCCA)	
Sept. 26-27 Central Florida Region (SCCA) Rally	
Sept. 26-28 Pyrenees Rally	Spain
Sept. 26 GP, Sports and Touring Races	Goodwood, England
Sept. 26-27 USAC Sports Car Race	Watkins Glen, N.Y.
Oct. 3-4 Pan American Regional Race (SCCA)	
Oct. 3-4 New England Regional Race (SCCA)	Thompson, Conn.

Why the man who owns one proudly recommends

ABARTH

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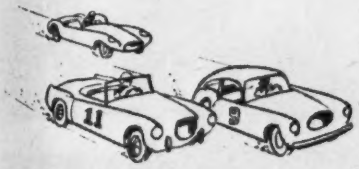
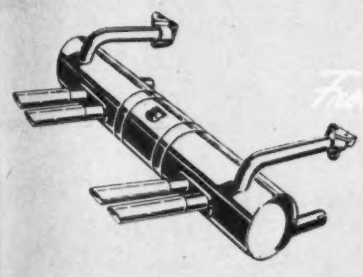
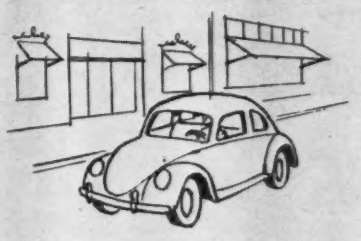


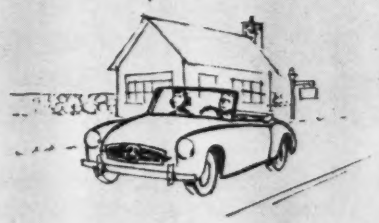
Everyone knows that Grand Prix Winners use and recommend ABARTH. But now read these excerpts from letters sent to us by non-racing ABARTH owners—from the man "next-door" who wants what you want in an exhaust system: greater fuel economy, easier passing, faster pick-up. They all agree that when it comes to fine Exhaust Systems—the *only* answer is ABARTH!

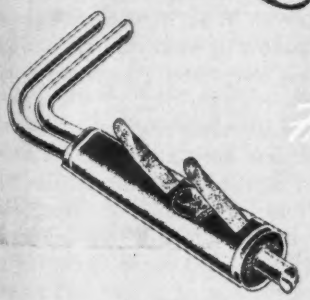


From **VW** owner, J. G. Tomkins, N. Y.—"Repeated checks on the same hill, starting up at 60 MPH, the speed at the crest has improved from 33 to 38 MPH. I still don't believe it, but it happens every time."



From **MERCEDES 190 SL** owner, Lt. Col. L. C. Coleman, Jr., Ret., Michigan—"Immediately after I installed the ABARTH System I could feel the improvement in performance. During a 1000 mile trip I checked the mileage on one or more tank-fulls and each time figured 30 MPG. 26-27 MPG was normal before I had installed the ABARTH System."





From **RENAULT** owner, Dr. J. R. Henning, Emporia, Va.—"Abarth muffler for my 4-CV worked so well I would like to have you send me one for my MGA."

Now Available – over 35 different ABARTH Free-Exhaust Systems! If the name of your car is not included in the coupon, fill in its name for complete data.

USE THIS CONVENIENT COUPON TODAY!

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Please rush free **FISHER-ABARTH** catalogue describing these, and many other systems and accessories. I am particularly interested in the —

☐	Alfa Giulietta Sprint Exhaust System	$69.50	
☐	Alfa Giulietta Spider Exhaust System	79.50	
☐	Austin Healey Sprite	19.95	
☐	Borgward Exhaust System, All Models	39.50	
☐	Fiat 600 Exhaust System, All Models	19.95	
☐	Fiat 600, with sports manifold	44.50	
☐	Fiat 1100 Exhaust System	49.50	
☐	Fiat 1200 Sedan	69.50	
☐	Jaguar 140M, 150, 150S	79.50	
☐	Jaguar 3.4	79.50	
☐	Mercedes 190-SL Exhaust System	44.50	
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☐	Peugeot 403 Exhaust System	49.50	
☐	Porsche, all models	44.50	
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☐	Renault Dauphine Exhaust System	27.50	
☐	Simca Aronde, All Models	49.50	
☐	Volkswagen, 1955 and earlier	32.50	
☐	Volkswagen, 1956 and later	34.50	
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GENTLEMAN DRIVER: TONY BROOKS

by Steve McNamara

Right: Tony Brooks after winning the 1,000 km sports car race at the Nurburgring in 1957. Far right: Seventeen months later, in October 1958, Tony married Pina Resegotti in Italy. Below: Brooks on a Ferrari during the 1959 GP of Monaco, which Tony finds more interesting than airport circuits or simulated road courses.

► Charles Anthony Standish Brooks doesn't look like a professional driver — his modest frame and thin face seem somehow out of place when topped by a helmet and goggles. He doesn't act like a professional driver — he is neither an extrovert nor does he radiate nervous energy, two hallmarks of the driving fraternity.

Although the SCCA Contest Board would disagree, Tony Brooks is not a professional driver. "Dental surgery is my profession. Motor racing is just a hobby which happens to have gone very well, so for the moment it is advisable to do motor racing."

This unemotional approach would stand out at a regional rally. It is rather more remarkable in the world of Grand Prix racing, a world in which Brooks is unquestionably one of the best five drivers, the considered successor to Fangio as the smoothest and most relaxed driver and a good bet for the world championship.

Brooks' attitude brings back memories of the Good Old Days when gentleman drivers such as Prince Bira of Siam could appear at Reims in a tailor-made Formula I Maserati sporting chrome exhausts. But as the years and private fortunes have passed, the front rank of drivers has come to be occupied almost exclusively by men who eat and sleep racing and in turn can eat, sleep and pay their laundry bills only because they race.

Brooks doesn't eat and sleep racing and he needn't race to pay his laundry bill. He has no manager nor secretary and all correspondence and contracts are handled by himself and his Italian wife, Pina. His reason for racing is disarmingly simple: "I don't have what you call a 'burning desire' to race. It's just that I've always enjoyed driving and the only place to get the best out of a car and yourself is on a circuit, not on the public roads."

Quick, confident and considerate, Tony Brooks is a gentleman driver with some differences. For many of the men of the past motor racing was the most public expression of a general zest for living which featured a great deal of night life and a great many young women. Brooks never smokes, drinks wine with his meals only during off-season, spends what free time he has at home in a London suburb watching television with his wife and says "I don't think

I've ever been in a night club in my life." But the principal difference between Brooks and the Biras is that Tony didn't pay his way into the front of the starting grid, he drove there.

Brooks' drive to the top has been a quick one (his first race was seven years ago) but except for a flurry of excitement in 1955, his retiring personality has held down the fanfare. He is a stranger to most Americans because he has raced in the States only once, at Sebring in 1958, and is not likely to return to Sebring unless required by a team contract. During the past few years, many Americans have scanned the race results and found "T. Brooks" at or near the top and wondered where in the world he came from.

He came from Dukinfield, Cheshire, 200 miles north of London where he was born 27 years ago last Febuary 25. His father, a dental surgeon who still has a private practice in Dukinfield, was "very enthusiastic and keen about motoring," Tony says, "but he never actually raced."

Tony was given a motorcycle when he was 16 but until he was 17 his four-wheeled motoring experience consisted only of driving the family car in and out of the garage. In 1952, when he was 20, Tony's talent with four-wheelers was such that his father presented him with a Healey Silverstone. Brooks and the Healey had their first race that year at Goodwood where they finished "fifth or something like that."

"At the beginning of the next season, that was 1953, I met a chap who had a Fraser-Nash and he asked me to drive it for him. I guess you'd call that my first big opportunity. The Healey Silverstone was a good car to learn in but it never had a chance to win. With a Fraser-Nash

(Continued on page 88)

Tony shared the wheel with Noel Cunningham Reid to win the 1,000 km sports car race at the Nurburgring in 1957. This was his second major victory, beating Fangio, Moss, Collins and Musso and he became the first Briton since Dick Seaman to win at the 'ring.

SCI Club of the Year

by Sherrie Zuckert

► Last year, Sports Cars Illustrated inaugurated an award to be given to the Sports Car Club of the year. Any and all independent clubs are eligible for this honor, which last year went to Scuderia X of New Jersey. Mail and more mail was the result of this feature. Mail in favor of; mail opposed to; and mail wanting to know "why not us?" The majority of mail however wanted to know "just what makes a 'Club of the Year', and how can my club get into the running?" This year we are proud to present the award to the Midwest Sports Car Club of Chicago, Illinois. Why? In anticipation of more mail—here's why.

What is this Midwest Sports Car Club—who are its members?

Stemming from the almost stereotyped scene of one TC owner meeting another in the early days, the Midwest Sports Car Club was founded by 13 enthusiasts in 1948. The club constitution states clearly the purposes and intent of this pioneer group ". . . To encourage the preservation, ownership, operation and maintenance of sports cars; To act as a source of technical information; To establish rules and regulations covering all activities of the club; To provide and regulate events and exhibitions for sports cars and their owners; To encourage careful and skillful driving on the public ways." Since then, the club has grown steadily. Drawing its membership from Chicago and surrounding areas, it now has an active membership totaling 120.

The club set up a schedule of two meetings a month—the first meeting to be for club business, the second to be of an informal and social nature involving movies, discussions and lectures. It is indeed noteworthy, that in this day and age of numerous sports car clubs and multi-memberships; this schedule of two meetings a month has been strictly adhered to—with the meetings attended by the majority of Midwest members, not to count the varied and numerous outside activities. Such a program of intense activity has made the club strong and kept interest at a high pitch.

Well—all clubs have meetings and events. What makes the Midwest Club any different?

The major problem encountered by a sports car club once it gets going is the "worker" vs. the "just a member" situation. This has always occurred in a club of more than 20 members. The "workers" hold office and head up committees, and spend most of their time at meetings exhorting the "just a member" to "get in and *participate!*" Editorials appear in club papers, threats of revoked privileges are tossed around, soap boxes are prevalent. All the noise is usually to no avail. The "just a member" did not choose his position. He joined a club to meet other sports car people and if he doesn't have time to work on committees and make every single meeting, he is cajoled and reprimanded by the "workers" as being just about worthless to the club. When he does find time to participate in things (it is, after all, his hobby) he gets the feeling that he is an outsider; for the "workers" are often a closed group. This problem

Above: MSCC rallys require a bit of doing if entrants want to wind up among the top ten. Here, competitors in a 1000 miler wait for a wooden ferry to decant them on the far shore. Below: Club President Ken Recu, suitably dressed for the 10-below weather, lowers tire pressures before running in the club's ice race on Sullivan Lake. Right: Mort Jacobs puts his "sneering" MGA through the hairpin turn on the club's dirt trial course.

Above: Jim Hartman, MSCC Racing Committee Chairman, runs his Aston-engined Arnolt in the "Midwest Faces Life" Driver's School at Wilmot Hills.

can make or break any club, be it for sports cars or tiddly winks.

In the Midwest Sports Car Club the situation is quite different, and sensibly realistic—and it works.

A series of checks and balances were set up in the original constitution of the Midwest Club to prevent "clique" management of the club. Normally, an officer can not succeed himself—even chairman of the board is a rotating position. Chairmanship is circulated with each board member serving only a three-month term. A constitutional committee is in effect at all times to interpret all club activities in line with the constitution—acting, in effect, as a supreme court.

In all elections, the office seeks the man —but only if the man is willing to serve the office — not himself. This creates interesting leadership since position is not forced upon anyone who's popularity exceeds his ability or interest in serving the club. Further, all members who have a commercial interest in the sport, such as car salesman, dealers, etc., disqualified themselves from office so that there would be no hint of self-serving commercialism in the club. This is a Midwest tradition.

Any sports car club has its share of people who are not interested in wheel-to-wheel competition, but who do have a general interest in the welfare of the club and the sport. For these members, the MWSC devised a special trophy, awarded annually. It is the Member of the Year award. As opposed to Midwest's Competition Award, the member of the year is chosen on a contribution to the club basis. Time available and time contributed is taken into consideration for a member's participation in various activities. The trophy is earned by points awarded for development of events, creation of activities — social or competitive, attendance, leadership, committee meeting attendance, *Big End Journal contributions*, sponsorship of new members, and any other function accruing to the club.

The Member of the Year award is not a lure, it is an award, and a highly coveted one, for the MWSC does not need to lure its members into activity. They're free to participate or not, depending on time and taste.

The two salient characteristics of the Midwest Sports Car Club today are growth and safety. MSCC is ferocious on safety and has made it a "cause" for the past three years. The membership card carries a full safety by-law and all member's cars are expected to meet its requirements at all times. Cars are spot-checked, often without warning, to see that safe equipment is maintained. This campaign has lost the Midwest Club a few members, but the membership in general is all for the successful safety rulings. The club is really hard going on the safety thing, to a point where they no longer throw as many "open" events as before, since difficulties are encountered in requiring their safety standards of guests.

In numbers, the membership has shown a 66 percent active increase in the past 12 months. The average number of 45 entrants participate in each event. Attendance at meetings is such that finding a convenient location of sufficient size for meetings is a club problem. At this time, the number of applicants for membership is higher than at any time in the club's history. Part of this is attributed to the fame, and extreme popularity of the club publication *The Big End Journal*.

A club paper of interest to outsiders — come now, what gives??? Inaugurated in 1955, the *Big End Journal* is one of the most impressive of club magazines. It presents 14 glossy pages, magazine size, of club doings, general automotive news, feature articles and photographs. In one typical issue can be found a survey on traffic safety throughout the U.S., a full summary of the past meeting, the latest news on parking regulations in Chicago, and the statistics of Europe's latest challenge to the racing world. There are steady monthly columns by various members recounting their rally experiences, incidents to their cars, and just general "discussion-type" articles. In addition there is a classified section for members looking for parts, selling or trading equipment or just plain general interest items. The club members contribute generously, and the result is a magazine that is of interest not only to the Midwest Club, but to any sports car enthusiast lucky enough to obtain a copy. The Big End Journal's quality is such that it could acquire a healthy circulation if sold to the public.

But the BEJ is not the only source of publicity for the Midwest Sports Car Club. Some of the rallies and events the club puts on are so unique that the Chicago papers have a field day covering them. And not only in the sports sections. The Midwest Club is a familiar sight on the feature and news pages of such papers as the Chicago Daily News and the Chicago Sun-Times.

What kind of events does the Midwest Club put on?

The Midwest Sports Car Club organizes an average of one or two events a month all year 'round. The schedule includes such things as the usual gymkhanas, hill climbs, rallies and acceleration runs and also features an annual "English Trials" day. The latter is a rough and ready jaunt through various fields and even streams. It is a "do" that is quite popular in England (parts and things are awfully handy in England) but is seen very rarely in this country.

One of Midwest's rallies included an art show in which the members exhibited their model cars, sketches, piston-flowerpots and photographs. The entry fee for this epic event including rally and show was a large 27 cents. Another annual feature event is the El Diablo Rally. This is a night event held in July of each year and named for the fiendish instructions. Since the rally is held on a Saturday night, "civilian" Sunday morning church goers find the various checkpoints they may pass rather soul-shaking . . . each is manned by a timer, complete with red horns and pitchfork. The church goers scurry post haste to church and the local newshawks to

(Continued on page 101)

Ed Crawford's old Porsche RS makes an appearance at one of the Midwest Sports Car Club's Concours.
MSCC member Frank Opalka has a go in an English-type club trial on the club's unpaved course.

Bottom: Ray Johnson (with lamp) and Bill Hinson man the first check point in the '59 El Diablo.

ROAD TEST MGA 1600

► It wasn't too many years ago that a long cross country haul in an MG could be looked upon as an adventure in frustration if much throughway or turnpike travel were on the itinerary. Secondary road travel was, and still is, another thing —the MG came into its own, sticking like glue and maintaining an average well above the capabilities of more staid machinery. But long straight turnpikes with their high constant speeds and, from a sports car standpoint, hundred mph bends were not the MG's dish of tea. Then it became a case of constant hours-long buzzing at a sustained engine speed that seemed positively painful to the sensitive ear while domestic machinery went whooshing past.

That day, gentlemen, is past—we guarantee it. It actually died with the TD and TF series but not entirely. The MG-A 1500 still retained some of the feeling that cruising speeds of 70 were somehow to be lumped under the various anti-cruelty acts. Not that the ubiquitous A won't do 70 — it will and much more, 20-odd miles an hour more, in fact — but it still didn't seem right. A steady speed of 65 or 70 in the 1500 is a matter of a bit more than half throttle. One knew one's foot was pushing the gasworks.

No longer. With the 1600 things are different. So much so in fact that it seems unbelievable that only 100 cc's are behind the difference. With a properly broken-in 1600 a steady speed of 70 mph is a matter of keeping one's foot out of it rather than pushing. It's not a matter of higher gearing and flat country either. Long grades that had trucks dropping down several gears and American automatics going into passing gear were nothing more than a mere eighth of an inch more throttle to Abingdon's latest offering.

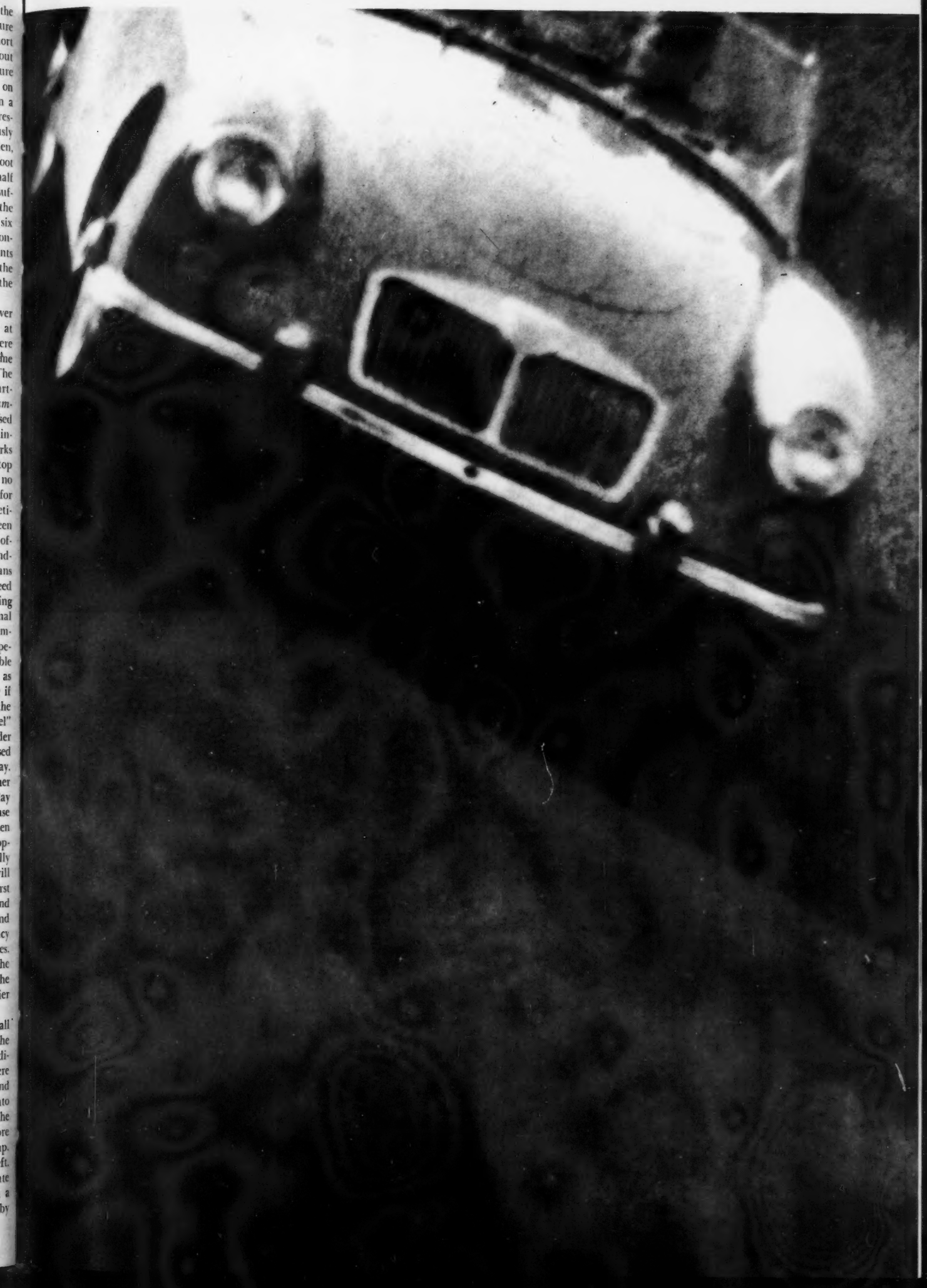
These things we know from experience. The experience was gained from a round trip of some two thousand miles most of which was on the recently opened network of turnpikes and tollways that run through New York, New Jersey, Pennsylvania, Ohio, Indiana and Illinois with a side trip to Detroit over what is now considered secondary highway for comparison.

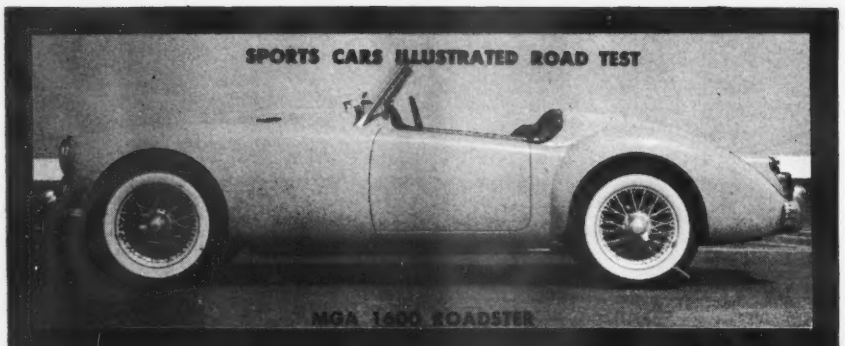
The car was run-in but not thoroughly broken-in when we picked it up from Hambro Automotive Corporation. The odometer showed a bit over 800 miles at the start of the trip. The first day's run started late in the afternoon and ran the length of the Jersey Turnpike and the Pennsylvania turnpike over a period of about eight hours total time including gas and food stops. A cruising speed of 60 felt right so it was the speed we traveled —all questions of legal rates of speed aside, especially since the legal limit in Pennsylvania is 65.

The next day's run started early. The only other car on the road was a well known two-liter roadster noted for its vim and vigor on the road. It was only after we sailed easily by the other car that any attention was paid to the speedometer, an exceedingly accurate instrument about which more later. This device claimed we were in the process of putting 75 miles into the hour. Not that 75 mph was any great surprise, it was just that, driving by the seat of the pants, we had been using the same throttle pressure that had, a few miles back, produced a shade over 60. The odometer showed 1273 miles. Obviously the previous day's run at a steady temperature and speed, the overnight stop and the short morning run had combined to bring about the perfect break-in. Water temperature which had been running at an even 185 on the cool day before was now down, on a much warmer day, to 175 and the oil pressure was up 5 to 10 psi due to an obviously cooler running engine. It was here, then, that the previously mentioned light foot on the throttle became necessary — half throttle would have been more than sufficient to bring down the wrath of the local gendarmerie. The remaining six hours into Chicago were run with the constant feeling that a case of shin-splints in the right leg was imminent from the conscious effort not to get too heavy on the throttle.

This ability to cruise seemingly forever at high speeds is not the only point at which MG's new star shines, either. There are several other items, some major, some minor in which the difference is felt. The biggest item is in the stopping department. New for this year is the disc-*cum*-drum brake set-up similar to that used on the Triumph TR-3 and the new Austin-Healey 3000 and like those units it works wonders. No-fade stop after no-fade stop can be made with these brakes with no loss of pedal or seemingly any need for higher pedal pressure. The BMC competitions department has for some time been using disc brakes all around and has offered these as an extra cost option (standard on MG Twin Cam). Unless one plans all-out competition there is now no need for these, the new Lockheed units being more than sufficient for club and regional racing. For those planning full-bore competition or major modification, the competition Dunlop brakes are still available but the average owner need not feel as if he has been left out of the running if he hasn't spent the extra money for the conversion. The major difference in "feel" between the new Lockheeds and the older drum brakes is one of slightly increased pedal pressure, especially on a wet day. It's just a matter of pushing a little further and a shade harder, though. On a wet day it is a good idea to tap the brake, release it and then push the pedal again when coming to a planned stop such as a stoplight or a toll booth but it's not vitally necessary since a slightly harder push will accomplish the same thing. The light, first tap merely accomplishes a cleaning and warming of the disc and makes the second tap a lighter effort. Straight line emergency stops can be made with no preliminaries. In fact the only reason we mention the preliminary tap at all is that cleaning the disc before a harder application is easier on the caliper pads and disc material.

We had occasion to be thankful for all this stopping power at one point in the test trip. Happily cruising along the Indiana Tollroad just at dusk one day we were startled to see a large, brown shape bound out from the ditched center island onto the roadway directly in the path of the MG. It was a large mule deer and not more than 30 feet away when it decided to leap. We hit the brakes, hard, and cut to the left. In an ordinary car or one with inadequate brakes we would have wound up with a large amount of venison in the cockpit by





ACCELERATION:

From zero to	seconds
30 mph	4.6
40 mph	6.7
50 mph	10.3
60 mph	13.7
70 mph	17.8
80 mph	23.4
Standing ¼ mile	19.8
Speed at end of quarter	73 mph

SPEED RANGES IN GEARS:

	(800-5500 rpm)
I	0-27
II	5-44
III	9-71
IV	12-top

SPEEDOMETER CORRECTION:

Indicated Speed	Timed Speed
30	30
40	40
50	50
60	60
70	70
80	80

FUEL CONSUMPTION:

22 mpg

SPECIFICATIONS

POWER UNIT:

BMC "B" series	four water-cooled, in-line
Valve Arrangement	pushrod ohv, in-line
Bore & Stroke	2.97x3.50 in (75.4x88.9mm)
Stroke/Bore Ratio	1.18/1
Displacement	96.9 cu in (1588 cc)
Compression Ratio	8.3/1
Carburetion by	Two SU H6
Max. Power	79½ bhp @ 5600 rpm
Idle Speed	800 rpm

DRIVE TRAIN:

Transmission ratios		overall	optional ratios
I	3.64	15.66	(2.45)
II	2.21	9.50	(1.62)
III	1.38	5.94	(1.27)
IV	1.00	4.30	(1.00)
Final drive ratio		4.30	(4.55, 4.88, 5.12)

Axle torque taken by leaf springs

CHASSIS:

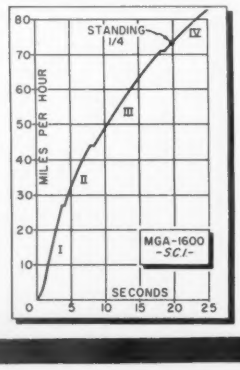
Frame	Box section
Wheelbase	94 in
Tread, front and rear	47½, 49 in
Front Suspension	Coil springs, unequal wishbones
Rear Suspension	Rigid axle, semi-elliptic leaf springs
Shock absorbers	Armstrong lever and piston type
Steering type	Rack and pinion
Steering wheel turns L to L	2.7
Turning diameter, curb to curb	32 feet
Brakes	Lockheed 11 in discs front, 10 in drums rear
Tire size	5.90x15

GENERAL:

Length	156 in
Width	58 in
Height	50 in
Weight, curb, full tank	2040 lbs
Weight, as tested (two up)	2360 lbs
Weight distribution, F/R as tested	49/51
Fuel capacity	12 U.S. gallons

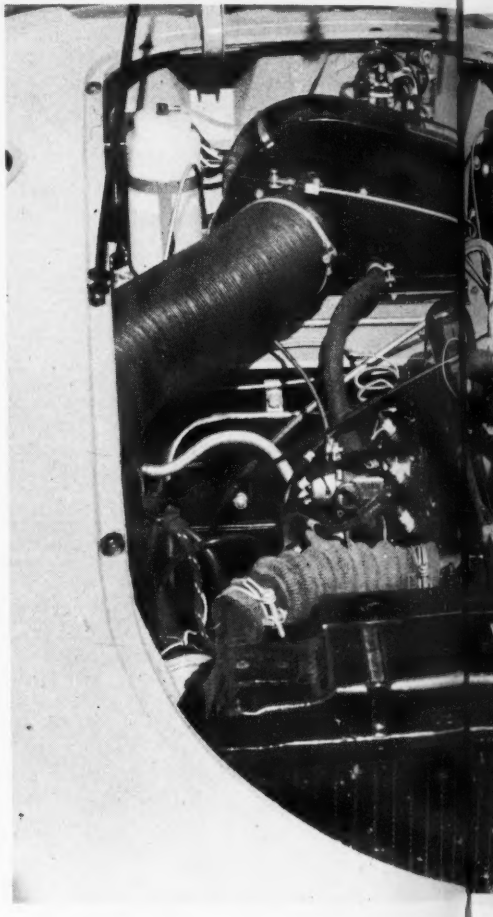
RATING FACTORS:

Specific Power Output	0.82 bhp/cu in
Power to Weight Ratio, as tested	29.7 lbs/hp
Piston speed @ 60 mph	2020 ft/min
Speed @ 1000 rpm in top gear	17.3 mph

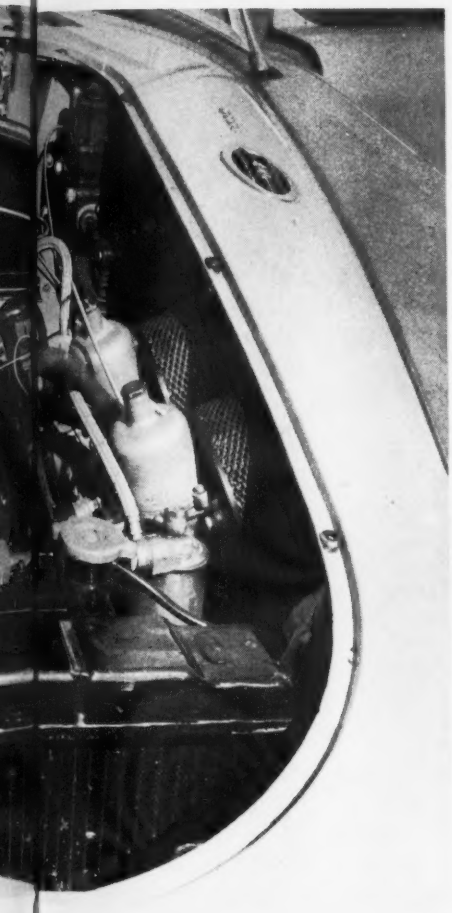


Right, the trunk lid still cannot be locked. Helping safeguard contents is well-hidden latch-pull in back of driver's seat. A lock and more space would both be welcome.

Safety Fast is MG's long-standing slogan; with Lockheed discs on the front and 100 more cc's under the hood, they've added to both.



Above: "When in doubt, bore it out." Though it looks the same on the surface, tenth-inch bigger bore inside makes a big difference. Right: X-spoked wheel combines strength with dashboard visibility. From left to right: tachometer, speedometer, fuel gauge and combined oil pressure-water temperature gauge. Far right: the single-wing nut, a holdover from at least the TC, has finally given way to this round knob for holding the side-screens in place. New, too, are sliding panels in the latter, one less accessory to purchase.



way of the hood and windshield. As it was, the deer clobbered the right headlight with a hind hoof and that was all. The state of Indiana had a sore-footed deer and we replaced a sealed beam headlamp at the next service pavilion and were on our way after reporting the incident to an amused Trooper.

Another major, although subtle, change is in the suspension. It's *different* somehow. There is less lean in the front and less dive on hard braking for one thing. This is due to minor changes: the springs are those used in the Twin Cam and therefore a slight bit stiffer and minor valving changes in the shock absorbers have been made to take the added spring beef. The rear end behavior is slightly different too. This is noticeable mainly on hard acceleration; where the earlier versions had a tendency toward rear end "walk" or alternate wheel slip this one lays a smooth strip and then bites in solidly. Strangely enough, the ride hasn't stiffened perceptibly, in fact, if anything it is a bit smoother with less of the well-known MG "chop" over small bumps.

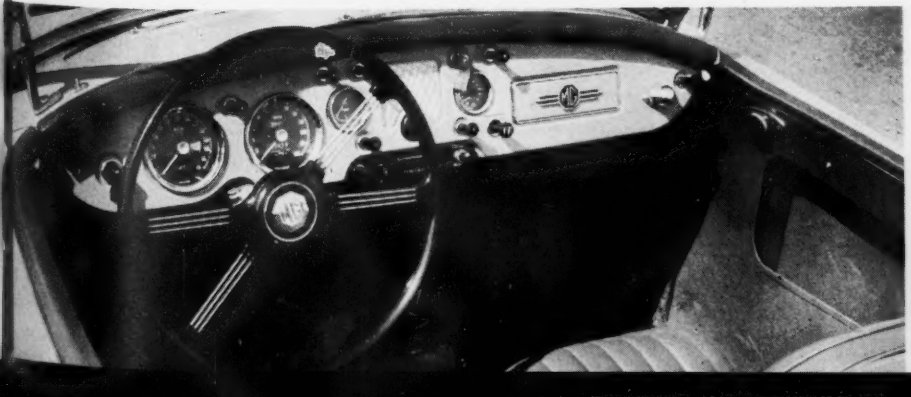
Handling is excellent as can be expected. The steering has no play, moderate return and a smooth travel from lock to lock. Road feel is there but there is none of the kick-back felt in the very early versions of the rack and pinion steering. Tracking on the straight is fair though with a slight tendency to wander with hands off the wheel. If you want to light a cigarette it's best to steady things with a knee. Like previous models of the MG-A this one has a mild final understeer built in. The rear end can be kicked loose but breakaway is even and predictable. This last we found out on the Meadowdale Raceway where we gave the car a thorough workout. Much of the course was covered with a layer of dried mud washed down by a recent rain. This was in the slow, lower part and had no effect on the upper, high speed sections. It was actually a help more than a hindrance since it gave us an opportunity to barrel the car under less than ideal conditions without endangering life and property and still use the high speed banking and straight for performance tests.

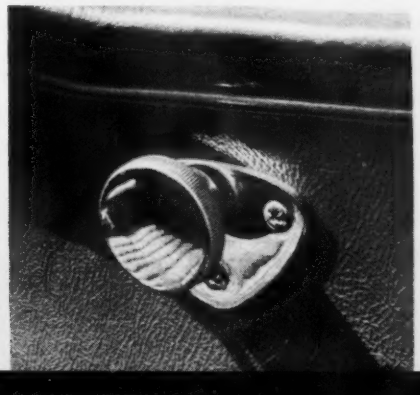
This new MG, as we pointed out earlier, gets up and goes. There isn't too much difference between this one and the 1500 in 0-30 and 0-40 times but as the terminal speeds for each run went higher the times it took to reach these speeds dropped startlingly. The difference to 60 is over one-and-a-half-seconds, and the difference between the two in getting to 70 is three seconds exactly; to eighty it is about seven seconds difference. The speed reached at the end of standing quarter was 73 mph, some five miles an hour faster than earlier versions. This was reached in 18.8 seconds on at least one of several runs, a second quicker. Top speed on the best of several runs was 102 with the top down and with a full windshield. To reach this we had to head down the back stretch and into the famous bumpy banking at a shade better than 85 which the car would hold all the way around, accelerating as it came off and reaching terminal velocity at about a quarter mile down the straight. We saw a good bit more on the speedometer further along but had to discount it because of the downgrade which began just a little more than a quarter of a mile from the banking. The figure we saw, for what it was worth, was 112 before we shut off for the dropping turn at the end of the straight. If you go off this one you land on highway 31 at a highly illegal rate of speed and in somewhat the wrong direction for continued good health so 112 indicated downhill is all we can vouch for.

Speaking of indications, we mentioned earlier the accuracy of the speedometer in this particular car. Beyond a doubt this is the most accurate speedometer we have yet seen in any test car. It indicated true speed throughout a range from 30 mph to 80 mph over distances from one measured mile to five measured miles. At one point, still tending to doubt the accuracy of any mechanical speedometer we held a steady 80 over a twenty mile stretch of road and did the twenty miles in fifteen minutes almost to the second. This is accuracy of a high order when one considers the optimism with which most speedometers record time and distance, usually with an error of several miles per hour at that speed over a single mile.

There are other changes made to the new MG that can be classed as minor but make themselves apparent as one lives with the car. There is, for instance, a clip at the top center of the windshield to hold the center of the front top bow which aids in weather sealing. Side curtains now have sliding panels instead of the miserable spring-loaded flaps on earlier models. The trunk lid no longer conducts rain water down into the trunk and onto the one thing you don't want to get wet. The one meaningless change is a new taillight grouping that seems out of keeping with the otherwise clean design of the car. Bulbous and jutting, this bit of work looks like a project of an overzealous home customizer who wasn't really sure of what he was doing. The battery and fuel pump are still hidden away out of sight and out of mind until something happens.

But these are minor considerations only brought to attention because of the overall excellence of the rest of the car. Beyond a shadow of a doubt, this is the best touring MG yet. —*jpc*





FORMULA K

IS FOR THE

KOMMON MAN

by Ocee Ritch

▶ Well, men, they tell us it has become a case of 'race or be branded a coward', so we might as well get ready to go on the starting grid. The old excuse that was valid for so long . . . "can't afford to get out there, much as I'd like to, old man, too expensive . . ." has been kicked in the head and all we have to worry about is having our teen-age daughters make us look bad on the track. In Karting or Formula K, a guy can go racing so cheaply that the average man can even afford the "extras". . . bandages, splints, medical care, skin grafts and so on, that are a corollary. Just what is involved, we will disclose hereinunder.

Ever since Art Ingles welded up the first minimum vehicle three years ago, there has been a kind of 4-wheeled atomic reaction. The "things" have multiplied like rabbits until (as this is written) there are 56 firms involved in construction of Karts and allied equipment. The multiplicity of builders can be attributed in part to geographic factors and to the ease with which one can get started in the manufacture of such a simple product. On the other hand, design and conception play a large part in the varied offerings. "Every man his own Colin Chapman" seems to be the rule and the net result is an almost bewildering array of choices so similar (or disimilar) that the novice is often stumped. Unless one has caught the fever from a Karting enthusiast in person or has scouted several dealerships, advertisements or brochures offer the only clues to relative merits of the basic products and, as we all recognize, sometimes imagination in copy runs ahead of reality.

Knowing that every SCI reader with a drop of red blood in his veins and $150 in the bank is bound to be interested in the new game, we took the liberty of writing each manufacturer for specs on his car, test-driving everything in range and compiling the net results for your edification.

First and oldest commercial producer of the tiny racers is the concern that has provided the whole kaboodle with a basic appellation: The Go Kart Mfg. Co., Azusa, California. Duffy Livingston and Ray Desbrow began whomping their little monsters up in a sectioned-off portion of their muffler shop in Monrovia and have long since graduated to a bona-fide facility, completely modern and well equipped. Devoted exclusively to the engineering and production of Karts, the plant has its own $15,000 4/10 mile road course and proving ground. As pioneers and leading instigators of the sport, GO KART has kept abreast of developments and a number of models now issue from the Azusa works. However, description of their 400 Kart, from which all the others have more or less descended, will serve as an introduction to everything else:

Chrome moly tubing forms both the side rails and the axles on this machine (most of the other brands use mild steel . . . both materials seem equally satisfactory for normal usage). Wheelbase is 44", length is 56", maximum height at center of seat back 21". These dimensions fall within the GKCA and Formula K maximums and, give or take an inch here and there, are stock for the industry. Powered by a Clinton A-400 cycle 2½-horsepower engine, the Kart in unmodified form will crank on an honest 35 mph top . . . with the average man's poundage added to its 82 lb. net weight.

The GO KART can be bought in completely unwelded form; just the pre-formed tubing, and necessary bolt-together pieces including engine for $129.50 which makes it one of the lowest priced units. A Kompleted Kart, welded together, but with wheels off and other small parts unassembled and unpainted, comes for $148.00. A works paint job costs $10.00 additional.

Welding time is a good afternoon's work for the loose kit. Assembly of the Komplete unit; ex-paint, from crate to parking lot is an hour. This involves hooking up linkage, steering, applying wheels, etc. and is well within the capabilities of the real dub.

So many other combinations, beyond the basic Kart, are offered by this firm; twin engines, hotter engines, fancy upholstery, chromed bits, and so on, that it would take an inordinate amount of space to list them. For features, the 400B Kart has a full circle, cast aluminum steering wheel (not a yoke as on earlier models), side rails to keep sissies in the seat, foot pedal operated dual spot brakes, and ball bearing wheels.

BUG, another pioneer manufacturer, offers a Standard model, completely assembled, less paint, and chrome, built around the A-400 Clinton for $149.95. By specifying the Custom model and coming up with an extra $40, you get a beautifully painted frame (white or black), foam rubber cushion covered with naugahyde, chrome steering wheel, shaft, rod and drag link. A nice package for the enthusiast who has no 'customizing' desires. A full dish-type steering wheel is standard on all models as is an internal-expanding automobile type brake. Side rails are extra on Bugs; $10 worth. Good features include rod instead of cable linkage and a narrow front hoop (supports the steering shaft) so that youngsters have no trouble reaching the pedals. A single-engined BUG weighs 86 lbs. Twin-engined models go for $209 and up.

The MANTIS ("an insect that devours bugs") is listed at $146.66, complete with upholstery, paint, etc. (no side rails available). This is a lightweight machine with all non-essentials pared away. Aircraft throttle rod type steering linkage, yoke (instead of a wheel) and other slight economies have resulted in a good package price. The Clinton A-400 is found attached to the left rear wheel here too, and its performance is comparable with other basic singles. No options are offered by this firm which operates out of Duarte, Calif.

The ACER RACER, from Maryland, varies construction details a little by using square steel tubing for frame rails and axles. Otherwise, its features are pretty well in line with those mentioned heretofore. Prices begin at $129.50 for the bits-and-pieces collection, $165 for a welded unit and $185 for a completely assembled car. A blueprint and spec sheet for the handyman who wants to start from the garage floor and work up is offered for $2.

The COOL CART makes use of a full metal belly pan dropped below the frame rails to provide a measure of lateral support and extra strength. This job is also available sans engine, (as not too many are) for the man who thinks for himself, and the firm favors Power Products' 2½ hp, 2-cycle buzzers for a stock engine. If anyone prefers to really think for himself and use the car for solo numbers they make Briggs and Stratton or Continental 4-cycle mills available. (Formula K rules are hung up on 2-cycle engines.) Prices begin at $115 (no engine at all) go to $145 for welded-but-unassembled kit and up to $164.50 for one with all the work done using the PP 2½ hp plant. More engines or hotter engines add on to the price, of course.

The PIXIE is also a square-tube model with a base price of $139 for a kit with all welding done, no chrome or paint and a clutchless engine. Price goes up to $179 for a completed car with a choice of red, yellow or black enamel paint and chromed steering assembly. Pixie's "two wheel" brakes are simplicity itself . . . pressure on foot pedal causes steel plates to rub on the two rear tires.

Here's what you can get—and what it will cost—to take part in the nation's fastest-growing motorsport.

1

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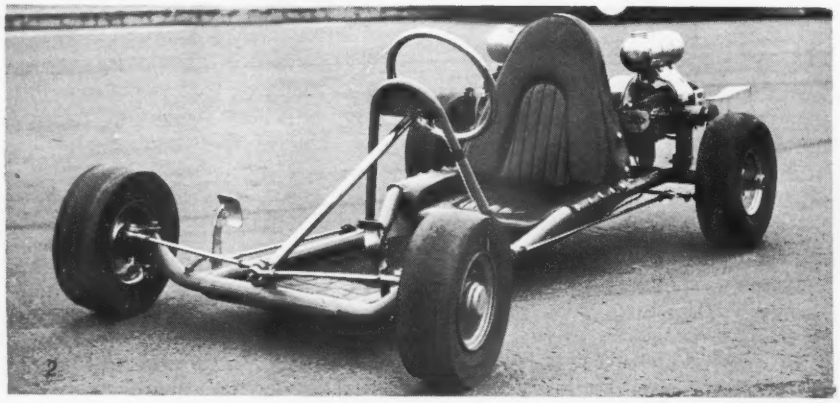
1. The standard Puttnik by Cummings Enterprises. 2. Volks Cart Spyder by Echo Engineering. 3. Standard Bug by Bug Engineering. 4. Lil 500 by 500 Co. 5. Caper Cart by Ben Hunt & Sons. 6. Go Kart 400B by Go Kart Mfg. Co. 7. Gopher by Gutknecht Enterprises. 8. Cool Kart by Reed Engineering. 9. K Kart by L. H. Knost Co. 10. Go-Boy by Fox Carts Inc.



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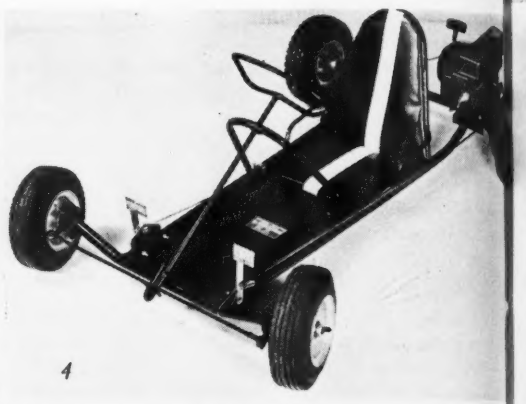

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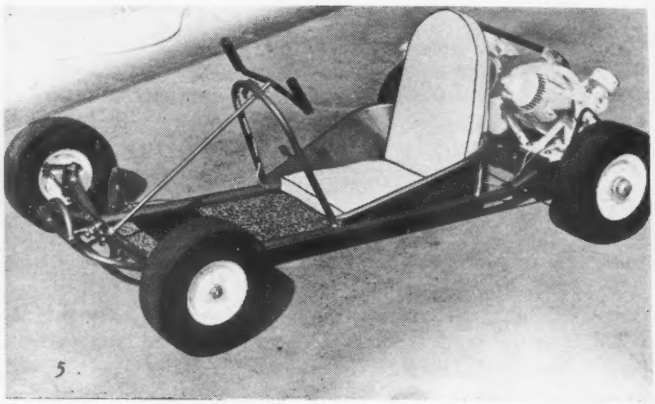

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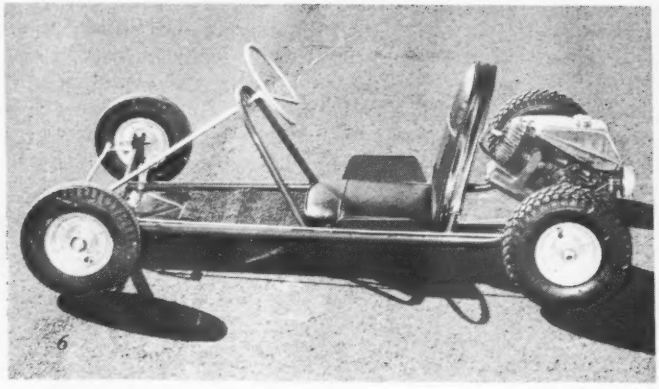

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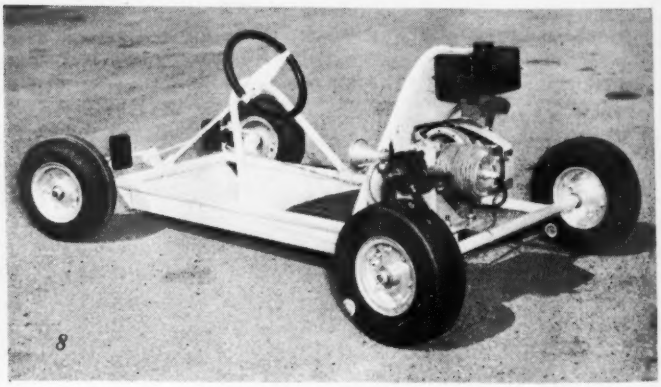

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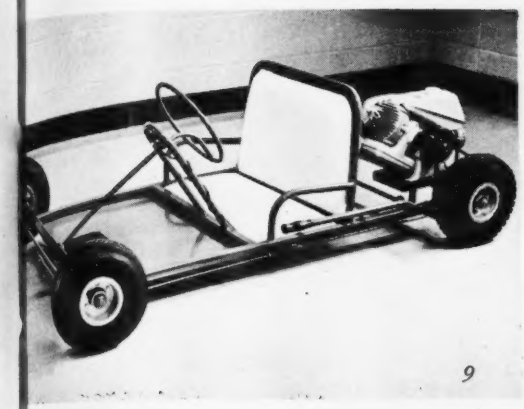
FORMULA 'K' CAR SPECIFICATIONS

Track and Racing Info

An ideal track for the Formula 'K' car is of the road-race-type-course, ¼ to ½ mile in length, 20 to 30 ft. in width, with from 7 to 12 turns (to keep the speeds controlled) and 1 or 2 straights (for acceleration). The surface should be paved (a good sized parking lot with suitable markers is sufficient). The heats should be set-up in classes according to the cylinder cu. in. displacement, with each race lasting approx. 10 laps. Protective clothing, such as: Helmets and goggles or shields, leather jackets, gloves, and long pants are mandatory.

1. *Height.* Maximum of 24 inches measured at center of seat back (not including height of any roll bar which may be attached).
2. *Frame.* All metal, devoid of any type of body shell above the wheel center.
3. *Wheelbase.* Maximum 50 inches minimum 40 inches as measured from center to center. Vehicle maximum overall length 72 inches.
4. *Tread Width.* Minimum of two-thirds the measurement of the wheelbase.
5. *Tire Size.* Maximum 12.5 inches, minimum 9 inches, of a type incorporating a pneumatic tube.
6. *Wheels.* To incorporate bearings of ball or roller type only.
7. *Brakes.* One rear wheel brake on Class A cars, minimum. Class B and C cars must have pedal operated brakes working in such a manner as to brake both rear wheels equally.
8. *Steering.* Direct and of a suitable design for maximum safety. Linkage bolts and nuts must be cotter keyed or safety wired.
9. *Exhaust System.* Exhaust system must be such that exhaust gases are carried away from and rearward of driver.
10. *Firewall.* Metal firewall between driver and engine.
11. *Engines.* Two cycle only (unless by invitation) of 16.5 cubic inch maximum cylinder displacement. Cars to be divided into the following classes according to cylinder displacement: *Class A*—up to 5.8 cubic inch cylinder displacement (95cc); *Class B*—5.81 to 11.6 cubic inch cylinder displacement (190cc); *Class C*—11.61 to 16.5 cubic inch cylinder displacement unsupercharged (270.385 cc), up to 5.8 cubic inch cylinder displacement supercharged.
12. No superchargers except on engines of less than 5.8 cubic inch cylinder displacement.
13. *Fuel and Lubrication.* Must be so designed as to prevent leakage or spillage during competition.
14. No appendage to the forward or side part of a vehicle which would constitute a hazard to other vehicles or drivers.
15. *Throttle.* Cars to be equipped with foot operated throttle.
16. Off and on ignition switch recommended.
17. No gear-changing device or transmission.

(Continued on page 82)



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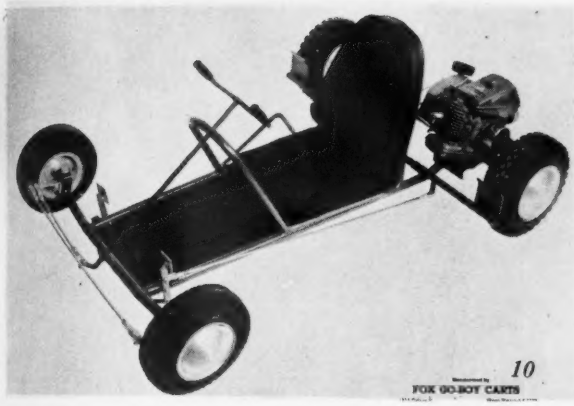

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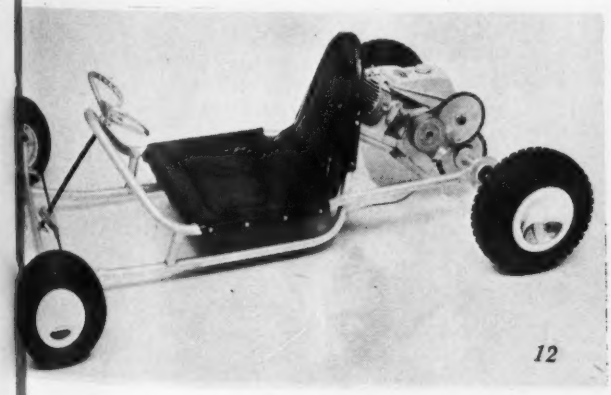
11. Mantis by Mantis Kart Co.
12. Cad Cart by Cad Cart Inc.
13. Class C Kart drone mill.



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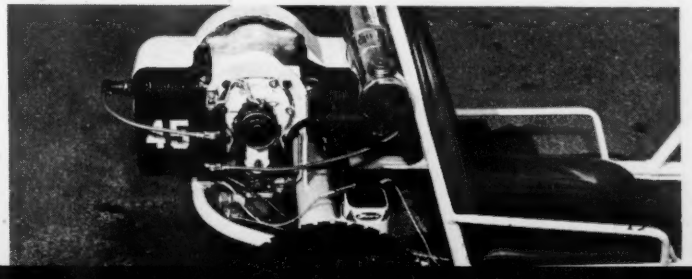
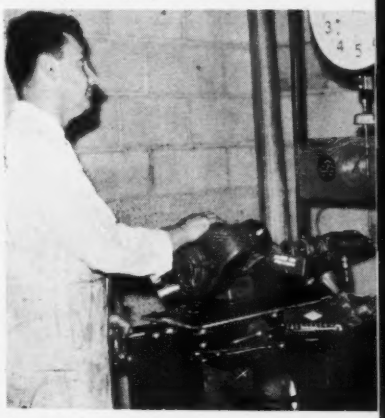
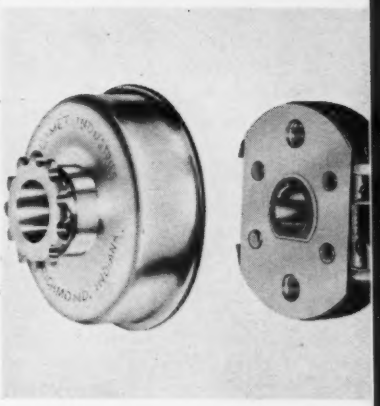
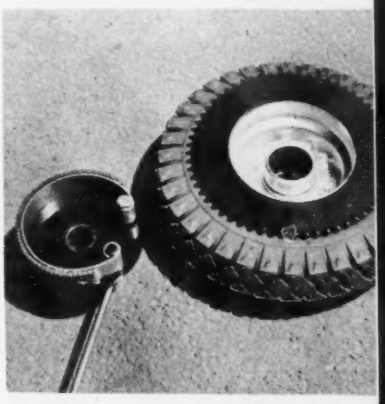


Below: Bob Palmini tests souped engine on tiny dyno built to check speed equipment for karts.







Above: Centrifugal clutch made especially for Karts allows engine to be idled permitting standing starts. Below: Bug expanding brake works fine.

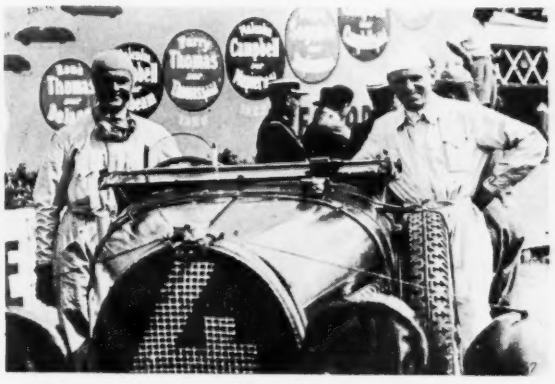
by Federico B. Kirbus

THE ELEVENTH HOUR

The 1953 Italian GP was an epic three-way battle between Ascari, Farina and Fangio. The world's three best drivers fought it out nose to tail for three hours with the lead changing hands every lap. Ascari spun on the last lap handing Fangio the win.

Top: Frenchman Pierre Levegh led the Mercedes team for almost 23 of the 24 hours of the 1952 Le Mans. In the last hour a missed shift sent the revs soaring in the big 4.5 liter Talbot engine, and a connecting rod bearing crumpled under the added strain. Bottom: Chiron (left) and Varzi were the leading players in two — 1933 and 1934 — Monte Carlo dog fights, but Achille Varzi beat Chiron in the last lap each time.

Top: Nuvolari dances his impatience as fumblers in his pit lose two minutes on a refueling stop during the 1935 German Grand Prix. Bottom: Old-timer Fagioli tries to nurse his Alfa home to a pre-determined victory, while Fangio lends moral support. The rapid approach of third-placer Rosier forced Fangio into the lead to win.



► In South America, where motor racing is rough, tough, and ornery, there is a saying to the effect that races don't end until the finish line is reached. This may sound rather like solemnly stating that water is wet; but how often people fail to realize how true it is! In racing, men and machines are strained to the utmost. A human error or a mechanical failure can happen at any time, whether in the heat of battle or when leading a race by miles with only a lap or two more to run off before collecting the checkered flag. There is always an eleventh hour in motor racing, and only those who successfully get through it can hope to win. Only when your wheels have flashed past the line and the flagman has dropped the most expensive flag in the world, can you be sure that race victory will not be snatched out of your lap by a last-minute misjudgement or by that tortured exhaust valve snapping at the worst possible moment.

This sort of thing has happened innumerable times, and will go on happening, because it's one of the ingredients that go to make up the composite picture of motor racing, however unwelcome it may be to those who see the money and glory fading away when only a few seconds more would have spelt out the difference. Fergus Anderson, the great British racing motorcyclist, once said that the most nerve-racking part of racing was when you were leading by miles and "only" had to continue going round and round to finish the required distance.

One of the classic examples of all time was what happened to Mike Hawthorn in the 1954 Buenos Aires Grand Prix. The race had been run under Formula Libre regulations, but all the fastest cars were team entries under the then new 2,500 cc Formula One. At the start Umberto Maglioli shot off in the lead and held it for three laps, but then Mike Hawthorn moved into first place. Maglioli became second and Farina third with a sticking gearshift. Fangio (Maserati) quit, Maglioli dropped back after a spin, and at ten laps Hawthorn led Farina by 7 sec., drawing away lap by lap. Farina quit with a seized differential and González (Ferrari) went into second place, 11 sec. away from Mike. Then González stopped, faint from the heat, and after some delay while tires were swapped, Farina protestingly drove away in González' car.

At less than half distance Hawthorn was 40 sec. away from second man Trintignant (Ferrari). Then Mike began slowly reducing speed, while the ever-methodical Trintignant cantered round and round impassively, always changing gear and braking at precisely the same places, never getting flustered or making mistakes. Farina was driving very fast, and had moved up to fifth place, but there did not seem very much chance of his being able to make an issue of the race. 60 laps went past out of 65, and Hawthorn led easily, from Trintignant, with Mieres third and Farina fourth. 61, 62, 63, 64 . . . Hawthorn triumphantly careered round the circuit on his last lap, while people wildly applauded this young British driver, then a novice, who had driven so well in his first season with Ferrari, Then, *on the very last corner,* the green-painted Ferrari spun out! At the finish line, an official was peering down the straight for Mike's car, check-

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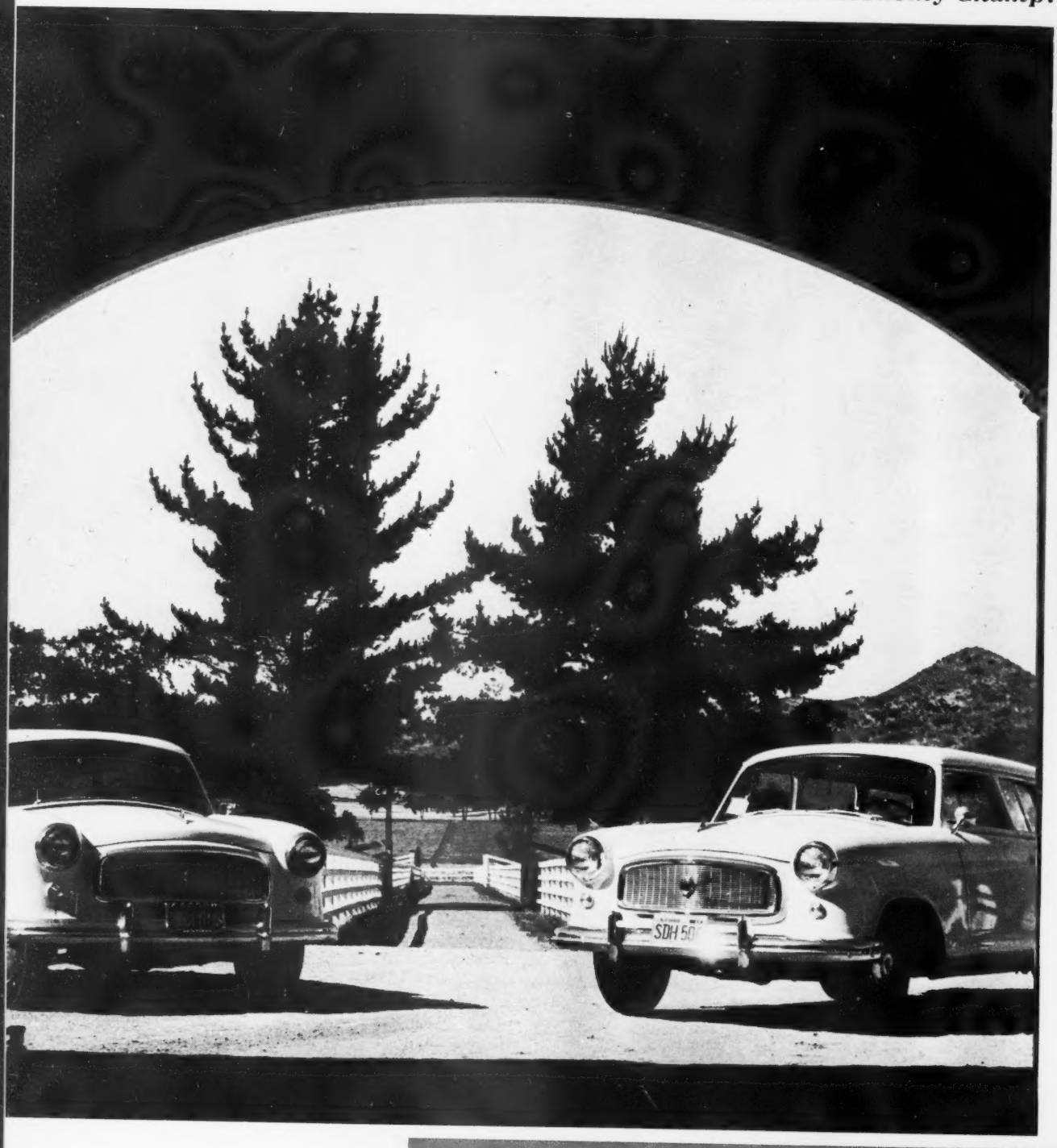
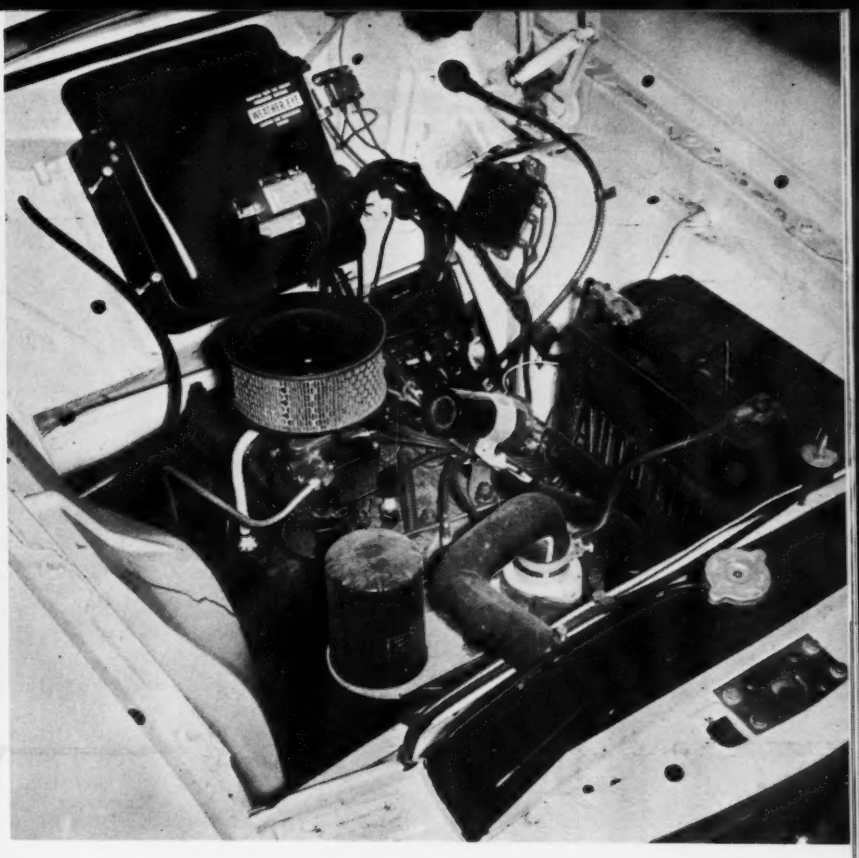
How Economical is America's Economy Champ?



ROAD TEST

RAMBLER AMERICAN STATION WAGON

The American wagon has room to spare even with huge racing engine safely tucked away on cargo decking.

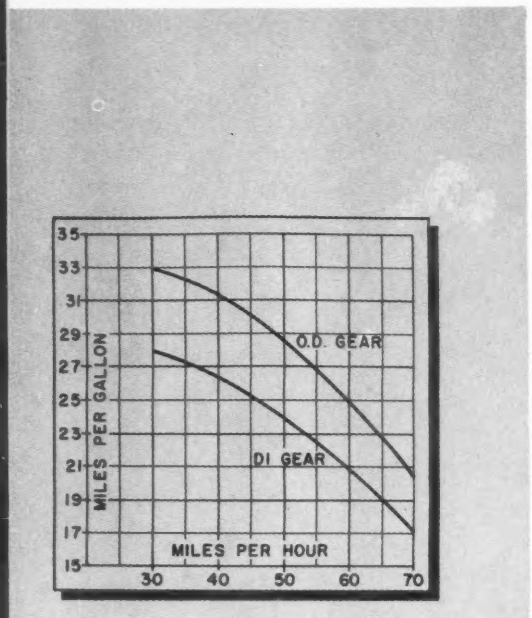


Above: Rambler's straight six is long on longevity, short on glamour.

Below: Compact American careens around skid pad at Oxnard-Ventura Airport. Steering remained neutral up to limit.

► In the early and mid-1950's it became manifest that the American automobile market would bear a great deal. All it would bear was discovered during a period whose finale we seem to be witnessing. The industry named the period "the era of the classless car". Ford or Lincoln, Cadillac or Chevrolet, all were replete with bulk, power, a hunger for fuel and a plethora — perhaps a sesquiplethora — of luxury features. Historic necessity finally prompted the revolution that denied the myth that all Americans go clothed in suits made from C-notes and the boom in economical cars began. European manufacturers were sucked into the waiting vacuum happily or, often, against their own skepticism of what they thought was a flash-in-the-pan fad.

American Motors was the first domestic manufacturer to cock an accurately perceptive ear to the trend. Acting on this perception and cheered by the possession of facilities which had been developed to show a profit from relatively low-volume mass production, AMC dared to breathe new life into the prematurely-born Rambler. The current Rambler American was a brilliant seller from the word go and at the moment and in many ways is the envy of the octopi of the industry. The car's greatest stocks in trade are compactness and fuel economy and this last virtue was reconfirmed dramatically in the 1959 Mobilgas Economy Run when an American, in spite of automatic transmission, emerged the nation's economy



champion. Over almost 2000 difficult and rapid miles it averaged 25.29 mpg and 40.9 mph. The fuel-stingiest competing make averaged 22.44 mpg.

Of course Economy Run fuel consumption figures represent what highly trained drivers can wring from well prepared machines under a given set of road and climatic conditions and these last, in this year's Run, were just about the worst possible. What can the average driver expect to get from an American, under average driving conditions? And what can he get with *and* without automatic transmission? To answer these questions, in addition to conducting a standard road test, we have covered over 10,000 miles in a brace of American station wagons, one equipped with stick shift and Borg-Warner overdrive and the other with the same vendor's automatic transmission, called Flash-O-Matic by AMC. The table which follows shows the price of automaticity in fuel consumption as well as the gas mileage that each of these cars can be expected to yield in ordinary tune and with ordinary driving. The wagons are heavier than the Run-winning sedan but the 850-lb. load it carried cancels out this difference.

FUEL CONSUMPTION	4.11 axle OD Trans. MPG	3.31 axle Auto Trans. MPG
Steady 30 mph	33.0	27.9
Steady 40 mph	31.5	26.4
Steady 50 mph	28.4	24.1
Steady 60 mph	25.0	20.4
Steady 70	20.5	17.1
Average, 50 miles, including acceleration & top speed tests	22.1	21.7
Average, 200 miles, mixed city and country driving @ 40 mph avg.	25.1	22.2

This is extremely good fuel consumption for cars powered by a 195 cu. in. (3.2 liter) side-valve engine. It is very pertinent to note that the Economy Run winner was perhaps the only car in the event that did not take advantage of the USAC rules' permission to use carb jets one stage leaner than standard. Since fuel economy is one of AMC's major selling points, the carburetion of this firm's engines is calibrated to an unusually fine degree; the stock jets are not to be improved upon for economy.

At the same time, the American's *go* performance is quite good by economy-car standards. The large engine has the torque that goes with ample displacement and develops this torque at very useful, low rpm's. The engine will not titillate admirers of mechanical exotica; it is vintage in concept but modern in details. It is smooth, silent, durable, docile, strong and economical to build, buy, operate and maintain. It fires up readily at the first kick of the starter and idles almost without a trace of sound or vibration and remains quite smooth out to about 1000 rpm beyond its rated horsepower peak.

At the wheel of an American you can't expect to win traffic-signal drag races against other Detroit products that often seem to have been designed around the consumer's less mature competitive drives. Neither do you get in the way, which often is unavoidable with many small-displacement cars. Instead you can hold your own nicely; you can violate speed regulations with ease; you have lively acceleration on tap at all legal speeds. You can pull heavy loads with very little effort, which we learned trailering a 16-ft boat and, on another occasion, hauling 1200 lbs. of engine parts in the OD wagon. You can thrash the car and still get excellent gas mileage.

We chatted in Detroit with AMC chief stylist Ed Anderson when the first prototype American was being hand-finished for public introduction. Anderson said, "People want to take pride in their cars. We want to give them a car which is economical but which has no air of cheapness about it. We could make a cheap car by making it chintzy . . . and we'd fail in the market. The American must be a car in which its owner can take pride of ownership. This raises the dickens with costs but in the long view it's the only route."

Anderson was speaking in terms of the car's body and its interior and exterior appearance and finish. But the party line he was voicing was that which underlies the vehicle's total design. The people who buy and drive Americans have no need to apologize for their choice on any grounds, including performance, appearance and finish. In fact, they can take satisfaction in these aspects of the car and back it up with sure knowledge of low purchase price, low cost of operation and maintenance, plus the other well-advertised virtues of the moderately-dimensioned car.

The most salient impression made upon us by the American is the integrity of its package . . . as equipped with standard transmission and overdrive. In this most popular version everything fits and harmonizes. The car looks fine, even when mingling with cars costing several times its price. It has style, without contrived gimmickry. The compatablity of body, engine, transmission and chassis is thoroughly satisfying. To drive it is a genuine pleasure.

Not so the automatic-transmission version. The unity of the product is lost with the use of what is perhaps the least satisfactory automatic gearbox in current manufacture. The quadrant indexing isn't good. Shifting is bad; it's noisy, it's slow and it runs away between shifts. Its engine-braking effect is inadequate. Paraphrasing the French automotive pioneer's immortal line, *"C'est brutal mais ça marche,"* if you must have one, this is a transmission that shifts for itself and it does march. Rambler is not the only domestic manufacturer to use this box. With it the American is equipped with 3.31 to one axle gears, which is too much for the engine to pull under even light uphill load without marked detonation, burning regular-grade fuel.

The manual-shift trans with OD and 4.11 gears is thoroughly satisfactory in all ways; the engine detonates only slightly under heavy load on non-premium fuel. The column-shift linkage is smooth and the synchromesh is positive. The neutral crossover distance seems to be needlessly wide and the non-synchro gears—low and reverse—clash when engaged at standstill.

This can be avoided not only by the common practice of first engaging a synchronized gear but by merely first shoving the shift lever in the general direction of high. Required clutch pedal pressure is light and the driver who prefers using gears freely for decelerating will find himself very much at home with this transmission.

The American's brakes are exceptional for a domestic car and compare favorably with good European practice. In our ten-stop fade test, nearly nil fade was registered on the decelerometer, which is almost unheard of for cars built in this country. The pedal pressure required for braking is minimized by the brakes' strong self-energizing action.

The car's ride is neither soft nor firm; it's so satisfactory that one is rarely aware that it exists. Only over bumpy or rutted surfaces do pitching and rear-axle hop become prominent.

The American's steering is light without any power assist and the wagon corners very well. It steers quite neutrally around turns until the limit of tire adhesion is reached, when there still is very little noise from the tubeless Goodyears. At this point the front end begins to push out, but the process is gradual and can be checked instantly by a slight let-up on the throttle. Throttle spring pressure, incidentally, is such that the foot can be rested on the throttle at any degree of opening; tense leg muscles are not required to maintain the desired position except in the case of automatic transmission kickdown.

The body trim is integral with the frame structure and is one of the most rattle- and squeak-free wagons in our experience. Optimum glass area makes for excellent visibility and we feel that AMC's retention of its inexpensive and entirely adequate non-wraparound windshield merits favorable comment. Inside the car the level of wind noise is low but front seat occupants do get some buffetting when driving at a good clip with windows lowered.

When the front bench seat is in full-reverse adjustment leg room still is skimpy for the tall driver and ease of entry from the driver's side is reduced by a seat adjustment lever which wants to snag trouser cuffs. The instrument cluster is located directly in front of the driver and consists of speedometer, odometer, gauges for water temperature and fuel and warning lights for oil pressure and generator. The remaining controls, including those for the Weather Eye ventilator-heater, are the essence of simplicity.

A much appreciated standard feature is the split back of the front seat with reclining adjustment all the way to the horizontal. It's possible for the front seat passenger to nap in a comfortable reclining position while the driver sits upright. Six passengers can be carried with ease or the rear-seat back can be folded flat to add to the already-large cargo space at the rear of the body.

Except for the automatic transmission criticism already made it is very difficult to find fault with the American. It won our admiration, as well as the admiration of the numerous Rambler owners we have interviewed.

—g b

SPORTS CARS ILLUSTRATED ROAD TEST

Rambler American Station Wagon

POWER UNIT:

Type .....In-line six
Valve Arrangement .....L-head
Bore & Stroke (Engl. & Met.)....
3.125 x 4.25 in./79.6 x 108.2 mm
Bore/Stroke Ratio ....1.36 to one
Displacement (Engl. & Met.) .....
195.6 cu. in./3207 cc
Compression Ratio .....8.0 to one
Carburetion by .....Carter YF
single-barrel downdraft
Max. bhp @ rpm .....90 @ 3800
Max. Torque @ rpm 150 @ 1600

DRIVE TRAIN:

Transmission ratios
I 2.61
II 1.63
III 1.00
Final drive ratio (test car).....
O.D.—4.11 AUTO.—3.31
Other available final drive ratio ....
3.31, 3.78
Axle torque taken by ....leaf springs

CHASSIS:

Wheelbase .....100 in.
Front Tread .....54.625 in.
Rear Tread .....55.0 in.
Suspension, front ....Coil springs
and unequal-length wishbones
Suspension, rear .....Semi-elliptic
Shock absorbers .....Telescopic
Steering type .....Worm & Roller
Steering wheels turns L to L 3.9
Turning diameter .....36 ft.
Brake type .....Hydraulic,
self-energizing
Brake lining area .....140 sq. in.
Tire size .....6.40 x 15

GENERAL:

Length .....178.3 in.
Width .....73.0 in.
Height .....57.8 in.
Weight, test car

O.D.	AUTO.
2750	2830

Weight distribution, F/R

O.D.	AUTO.
51.6/48.4	51.8/48.2

Fuel capacity—U.S. gallons 20

RATING FACTORS:

Bhp per cu. in. 0.46
Bhp per sq. in. piston area ..1.96
Torque (lb.-ft.) per cu. in. 0.77
Pounds per bhp—test car

30.6	31.4

Piston speed @ 60 mph

2240 fpm	1800 fpm

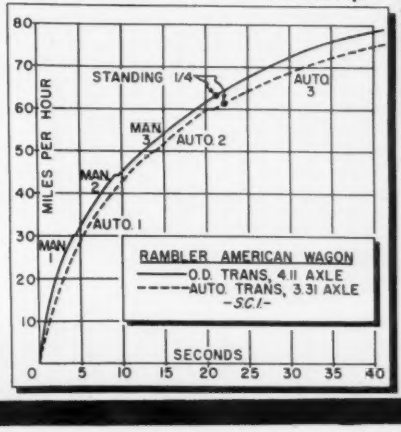
Piston speed @ max. bhp .....
2690 fpm

TOP SPEED:	O.D.	AUTO.
Two-way average....	87.0	84.8
Fastest one-way run..	87.4	86.1

ACCELERATION: From zero to	Drive range	Low range
30 mph	4.4	5.4
40 mph	7.5	9.0
50 mph	12.5	13.6
60 mph	19.5	20.1
70 mph	27.6	32.0
80 mph	42.9	49.8
Standing ¼ mile ..	21.3	22.1
Speed at end of quarter	63	62

SPEED RANGES IN GEARS:

	O.D.	AUTO.
(1) I	zero to 30	
II	2 to 44	
III	18 to top	
(Automatic Trans)		
(2) LOW		zero to 40
DRIVE 1		zero to top
DRIVE 2		zero to top



SOUP IS NOT THE FIRST COURSE

by John Thornley
(Director and General Manager, MG Car Company Ltd.)

► It is pretty certain that anyone who becomes interested in motor sport will, at some time in his life, contemplate altering the specifications of his car to something that is different from that which the designer intended. If he gets beyond the contemplation stage it is a safe bet that he will start doing things that are aimed at getting more power out of the engine. And this being so, it is dollars to doughnuts that he will be doing the wrong thing.

What he is anxious to achieve, surely, is to reduce the time he takes to get from *A* to *B*, whether *A* and *B* are, respectively, the start and finish lines in the club driving test or his own house and that of his Aunt Elsie, some distance away across country, whom he will be visiting at a brisk pace on Saturday afternoon. In either case he will have a better effect on his times—not to mention his chances of staying alive—if he first directs his attention to his steering, suspension, and brakes, leaving the engine until last.

In a car that has been properly designed, particularly one that has been designed to go fast, acceleration, maximum speed, suspension, and brakes are matched—which is another way of saying that none of these features is any better than it need be. Even in the 'expensive' sports car, where it might appear that price has been no curb on the designer, one can be sure that thoughts of cost have intruded at some stage and that, for instance, the brakes are no more than adequate. If the owner 'soups up' the engine to give him, say a 10 per cent increase in maximum speed, then his brakes are going to be that much less than adequate.

This same sports car will have been extensively tested in the design stages, for stability and rational behaviour in fast corners. Again the bogy of compromise will have entered into the considerations; perhaps not cost this time, but the need to provide some degree of comfort at some sacrifice in road-holding. The designer's ideas as to the minimum acceptable degree of comfort may well not be the same as the owner's. In any case, it is likely that the vehicle will be capable of reaching the limits of its inherent stability even with its standard engine. In these circumstances an increase in engine performance will add little to the overall speed of the vehicle over the ground.

If these arguments are legitimate when applied to a well-designed sports car, how much more do they apply to the 'bread and butter' car, the family saloon. Here the minimum acceptable degree of comfort is higher, leading to softer suspensions; the ease with which the traveller must be able to get in and out leads to a higher centre of gravity than might otherwise be possible; and the cost bogy has undoubtedly been very active.

Up to now we have omitted to mention the steering. Here we must make what is probably an over-assumption, viz. that the design is such that the car is inherently directionally stable! We are concerned purely with ratio. The criterion here is that *if* the car misbehaves, *if*, for instance, the back end breaks away on a fast corner, the driver must be able to 'put the helm down' quickly enough to 'catch' it. That bane of the sports-car owner's existence, Mr. Average Motorist (how interesting it would be if he had featured in *The Pilgrim's Progress!*) demands that he should be able to park his vehicle in a confined space with the absolute minimum of effort. In the absence of power steering this leads to a much lower steering ratio than the ideal demanded by the sporting car driver. It means that when the vehicle is a bit naughty or when the driver 'overdoes it' (which is much the same thing) there just isn't time in which to turn the wheel to avoid disaster. At the risk of wearing the phrase thin, we must emphasize that with a safe, fast car the driver must be able to 'wring its neck if it doesn't behave'.

There is another aspect to this. Most of the usual engine-tuning routines have the effect of increasing the power at the top end of the power curve—with or without an increase in maximum attainable engine speed—and with little or no advantageous effect on the power available lower down the curve. Indeed, the use of larger carburetors (and more particularly, camshafts with increased overlap) achieves an increase in maximum power at a *sacrifice* of power in the middle ranges.

Now if we accept the limitations of road-holding and cornering power postulated above, it is clear that an increase of maximum power will be of value only on comparatively rare occasions (i.e. on long straights) and even then the demand for good brakes will be likely to become acute. Roadworthiness features being equal, it is *acceleration* that is needed rather than maximum speed. Admittedly this can be improved, if the tuned engine is allied to a lower rear axle ratio, but this only serves to emphasize the general theme that it is all those bits of motor-

car *other* than the engine that should receive attention first.

All right! Let us assume that you are convinced so far. Where do we start? Putting the various features in the order of the maximum benefit for the minimum effort, we arrive at sequence: center of gravity, suspension, steering and brakes. Of these the first two are likely to be more or less closely inter-related.

That a vehicle should have soft suspension implies that the vertical movement of the road wheels relative to the body shall be comparatively large, i.e. the springs have a low rate. This rate will be so determined that with the vehicle fully laden—all seats occupied and with a full load of fuel and luggage—the suspension will not quite reach the limits of its permitted travel even when the car is driven over quite considerable road inequalities, such as those of a hump-backed bridge. Moreover, the body will usually be designed so that, with the suspension fully deflected, there is still sufficient clearence between tires and wheel archs for snow tires and even snow chains.

Now, for sports and high-speed touring purposes higher rates of spring and lesser wheel arch clearances can be permitted. This in turn means that the static position of the wheels can be a good deal closer to the body. Ergo, the whole car can be lowered.

How this is achieved will depend on the nature of the construction. Leaf springs may be re-formed to a new camber; coil springs may be shortened or, preferably, replaced by shorter springs; torsion bars may be let down at their adjustments. Alternatively, in any of these cases it may be possible to devise packing pieces that will achieve the same result. If the car in its normally laden static position is cocked up at one end or the other—a not uncommon feature—then an attempt should be made to level it off by reducing the high end more than the lower. To lower only one end by 1 in. probably lowers the overall C.G. by ½ in., which is worth having.

But a word of warning here. A few cars —mainly in the sports and semi-sports categories—already have their C.G. as near to the ground as it is safe for it to be. A car with a very low C.G. will have little tendency to roll and, in consequence, poor adhesion on corners—particularly greasy or icy ones. Lowering should be applied only to those cars that are in any way high-built or that roll excessively for high-speed comfort. And it *may* even be possible to improve the adhesion of some cars by *raising* them, thus encouraging an increase in weight transference on corners. Naturally stiffening of the suspension will also contribute to roll resistance, and the opportunity may be taken when adjusting the *height* of the suspension to install springs of higher rate. Remember, though, that small differences in rate produce big differences of behaviour, and some experiment here may be necessary.

Lateral anti-roll or anti-sway bars, as their name implies, help to keep the vehicle upright and have the advantage that they control roll without affecting the car's pitching characteristics. This can be important.

And so to steering. The imoprtant thing is to ensure that every movement of the steering-wheel produces an immediate and proportionate effect upon the road wheels. A condition must not be allowed to exist where time and effort are expended in turning the steering-wheel an appreciable amount in order to take up the slack, and to wind up the springiness in the linkage and mechanism between the driver and the road.

Rack and pinion is wellnigh ideal in the directness it provides. Sometimes, indeed, it would be pleasant to be able to lower the ratio, but the irreducible minimum diameter of the pinion prevents this. Not least of the reasons for the directness of the steering is that the rack housing is usually firmly clamped to the frame—probably in two places — and cannot move. This is where the cam type of steering often falls down. If your car has other than rack and pinion, get someone to turn the steering-wheel back and forth while you watch the box carefully. It is almost certain that it will 'weave' to some degree, trying to rotate on its mounting in the opposite direction to the wheel. A fabricated piece of ironmongery, providing a firm additional anchorage from the steering-box to some nearby part of the frame, will work wonders.

Checking the tightness of steering joints and the condition of the bushings of relay levers, if any, is elementary stuff. But we might, with profit, give a thought to the rubber bushes that are used in profusion these days to hang the suspension onto the frame or monocoque body. Rubber is used with two ends in view; to avoid the need for lubrication and to insulate road shocks and noise from the car. In the latter lies the key to many pecularities of a car's behaviour. To keep the car quiet, it is almost odds-on that the rubber is softer than the needs of maximum stability dictate. Under cornering loads the rubber will squelch and allow the various bits of steering and suspension to take up relative positions undreamed of by the geometricians. This produces that unfortunately none-too-rare sensation that one is sitting at the wheel of a motorized blancmange. The fitting of harder rubbers will help to keep things in their proper places, but, of course, some harshness and increase in noise will result.

In all cases where alterations are made you will test the car before and after to assess the result. *Do not trust your judgment.* Do the job scientifically round your pet country corner and time it with a stopwatch. In this matter of roll, for instance, you wouldn't believe, in the absence of the evidence of the watch, how much faster a 'roller' will sometimes get round compared with the car that stays comparatively flat.

Even brakes are subject to design compromise — between fade resistance and pedal pressure, which, in turn, is determined by the mechanical advantage (leverage) of the system and the acceptable pedal travel. Generally speaking, a lining with a high initial coefficient of friction is more susceptible to fade than one with whch more pedal effort is required. Here again Mr. Average Motorist demands that he has all his normal braking with the minimum of effort, so a soft lining is fitted which will probably fade under continuous heavy use. The remedy is obvious; change to a fade-resistant lining and put up with the higher pedal pressure.

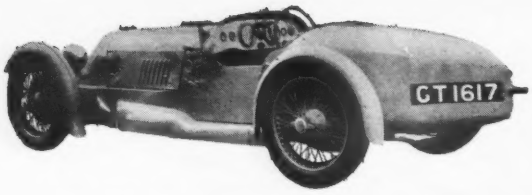
If you are unfortunate in having a car with a very hard pedal—i.e. where the brake pedal has very little free travel—and, what is more, still has very little travel when the brake-drums are at their hottest and fully expanded, you may be able to reduce the pedal effort by changing to a size smaller master cylinder. However, this manoeuvre needs a careful approach or you may be left, despite non-fade linings, with the pedal hard on the floorboards and 'just nothing there'.

Here then, are few lines of thought on ways of improving the roadworthiness, safety, and overall performance of a car before any attempt is made to increase power. But remember, the most profitable line of approach, despite all that has been said, is first to make sure that the car is as the designer intended it to be. Most times this is not a bad starting-point. *—jt*

TAYLOR - MADE

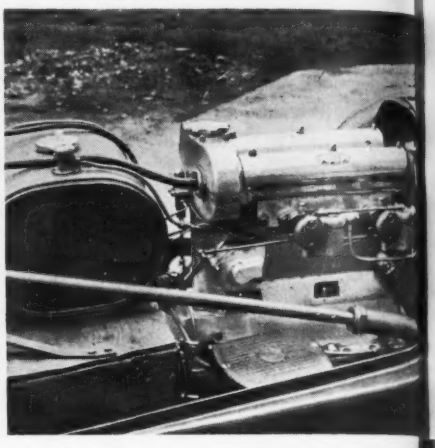
Geoffrey Taylor never made money out of racing, but his Alta engines helped shape the careers of a whole who's-who of stars.

by Dennis May



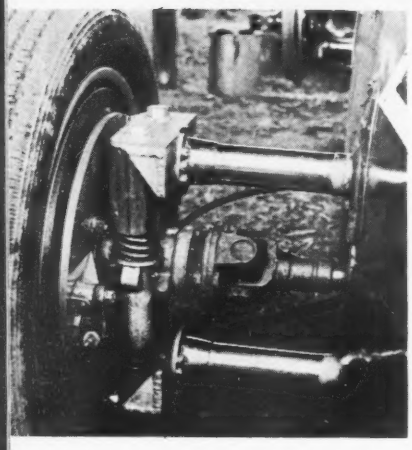
The first Alta (above) featured a "do-it-yourself" crankshaft cut from the solid with hacksaw blades.

Taylor makes the grade at Shelsley in a 2-liter Alta. Two cross tubes up front supported vertical slide ifs.

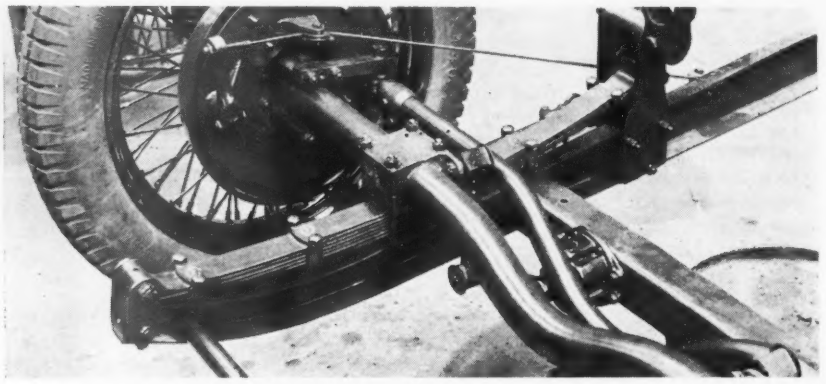


Geoffrey Taylor at the Brighton Speed Trials in 1946. He was a graduate student of the cut-and-try school of engineering.

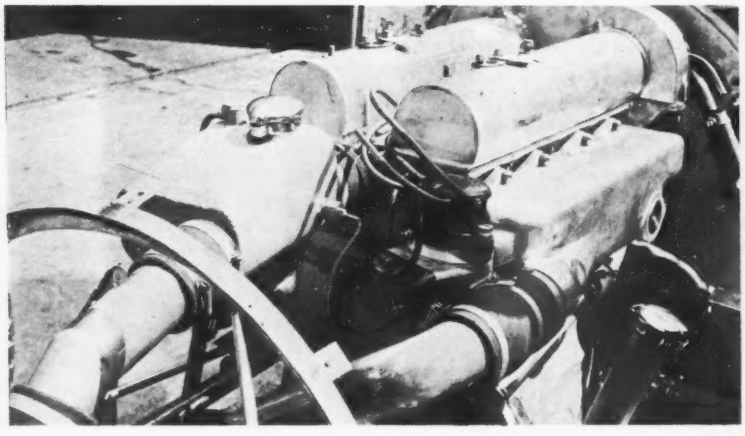
Original 1100 cc Alta engines (above right) had such advanced features as DOHC, all-alloy construction, hemispherical heads and roller main and big end bearings. It developed 49 bhp.



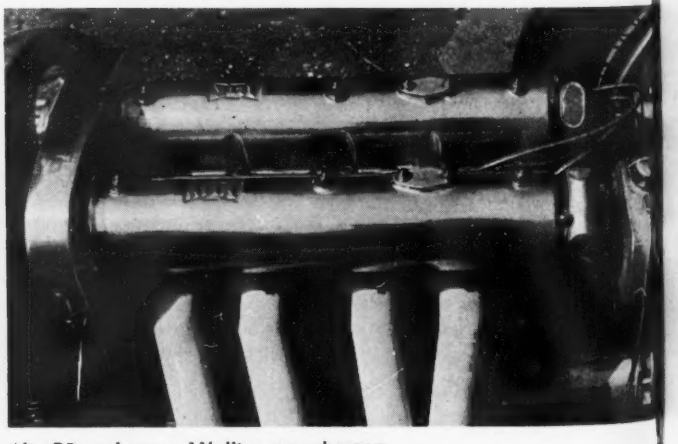
Independent front suspension on 1936 car utilized upper and lower coils.



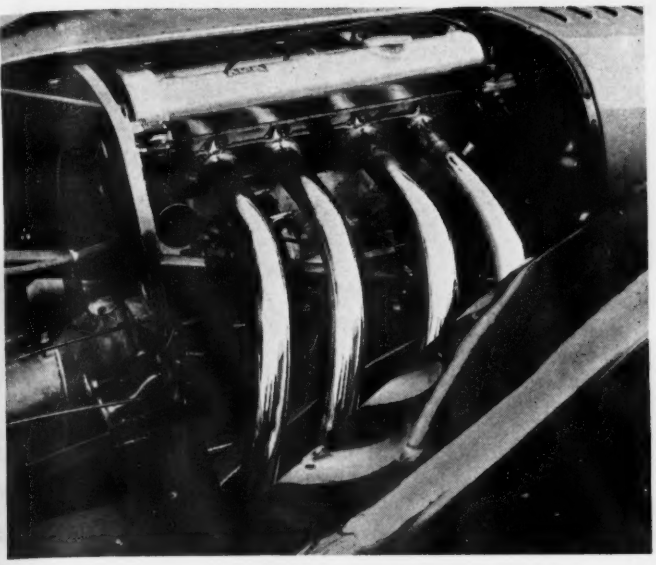
Early chassis had solid axles with leaf springs located above sidemembers.



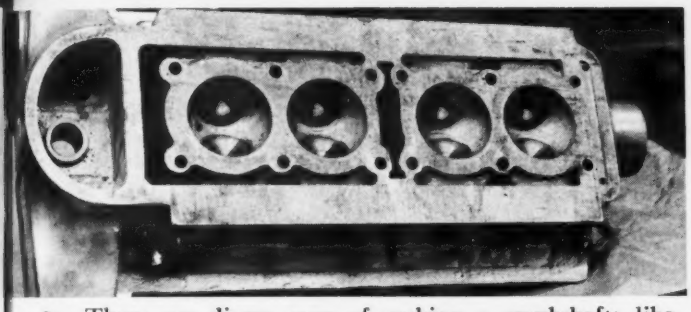
Same engine from the front. Later versions of this power plant had two stage supercharging. It was dropped before its full power was realized.



Alta GP engine was 1½-liter supercharged was not unlike engine built in 1926. Header tank located over blower on right.



Two-liter supercharged Alta sports car was perhaps the fastest road car marketed in Great Britain at the time. Cylinder head (below) of first Alta engine had 90 degree valves and inserted seats. Camshaft drive tunnel is invisible at left.



► There are divers ways of making a crankshaft: like forging, for instance, or casting — or just simply worrying the thing out of a solid steel billet with a hacksaw and cold chisel. That's how Geoffrey Taylor, in his physical prime and no great hurry, fashioned the crank for the first Alta engine ever built. To occupy his mind as he sawed, he read, finishing the weeks-long stint ankledeep in toothless blades and slightly surfeited with the printed word. Four conrods followed, likewise hacksawed from the solid.

Labors like these either drive you nuts or they case harden your character with optimism and independence. For his part, Taylor survived the prototype Alta's two year gestation period with his sanity intact — forearmed against the occupational hazards and rigors of racing and sports car manufacture on a tight budget and with stringently limited facilities.

By any criterion as vulgar as volume of output, the Alta Car and Engineering Company Ltd. was an insect. In a twenty-eight year lifespan, starting in 1931 and ending last January, the firm produced about ninety complete cars and a further fifty engines for installation in HWMs, Connaughts, Coopers and suchlike. At its peak, the Company had a payroll of thirty-five. But Alta's impact on the competition world, relative to its nugatory birthrate, was phenomenal. Prewar, a small elite of Alta drivers consistently bothered, and not infrequently beat the cream of the ERA talent on the English circuits of the day. Postwar, under the 1500 cc blown *cum* 4½ litres unblown formula, Alta was the only British make producing full GP cars for sale over the counter. As exclusive purveyors of engines to HWM in the era of the old (2 litre) Formula 2, Alta supplied the heartbeat for Britain's sole regular protagonist in this important league; and in so doing was halfway instrumental in moulding the careers of such coming stars as Moss, Collins, Schell and Frere, developing the already mature technique of men like Chiron, Giraud-Cabantous, Fischer, Bira, Abecassis, Rolt, Hamilton, Claes and others. When the *Motor*, in 1952, said that outside of F3, HWM had "the finest record of all British cars", Geoff Taylor was fully entitled to share the bow taken by HWM's animator, the late John Heath.

And the final feather in Taylor's sparse and sandy hair (he never had a hat to stick feathers in) was of course Tony Brooks' surprise victory on Connaught's behalf at Syracuse in October of 1955. This, you'll remember, was the first continental grand prix win by a British driver of a British car in thirty-one years, and gave Britain the toehold on the F1 ladder that was to lead, three years later, to her world championship titles in both the driver and constructor categories. The winning Connaught at Syracuse, along with all other cars of this make since the finish of its initial flirtation with Lea Francis, had an Alta engine.

There wasn't anything *anonyme*, as the French say, about the Alta Car and Engineering Co. Ltd. Geoffrey Taylor *was* Alta. He'd floated the company in the first place; he was one of only two directors it possessed (the other was its step mother); he designed every car and engine that ever emerged from the little factory at Hook, just beyond London's southwest fringe; there never was an Alta, probably, that he didn't work on with his own hands at one stage or another. As far as salesmanship played any part in Alta affairs, Taylor did the selling; and when occasion demanded, which was fairly often, he also served his own writs on defaulting customers, rising at daybreak in order to slap legal papers on them before they could slip out of their holes and get lost. In between times, he drove Altas in Trials, hillclimbs, straight sprints, circuit races ranging from lapdashes to 250-milers, on grass tracks, and even an isolated dirt track or two.

Although Alta drivers in the thirties had their share of success in speed sport covering a variegated field, the take, on aggregate, fell short of reasonable expectations based on Taylor's advanced thinking as a designer and the conscientious safety margins he usually built into his products. Although, naturally, he sometimes boobed in his own right, this shortfall was more often the result of poor driving or bad maintenance and preparation of their equipment by private owners. One time in 1936, to quote an instance, he showed up unexpectedly at the quarters of an Alta operator who'd just recently taken delivery of one of Geoffrey's current independent-all-around 1½ litres, and found this fellow's mechanic busily breaking in the bigends by an unusual process: *with the sump off*, he was motoring the thing briskly around the yard in low gear for spells of perhaps ten minutes, then pausing to cool the bearings off in kerosene preparatory to pinching them up by what he guessed was an appropriate amount, then another ten minutes of air cooled agony for the bottom end, and so on. The owner unfortunately killed himself in this car some weeks later.

Maybe the trouble was that these prewar racing Altas, advanced as they were, were too cheap. Underselling the contemporary ERA's, they sometimes attracted a type of customer who could just barely rustle up the purchase price, leaving no margin for the inevitable parts replacements and service in after life. There were, of course, honorable exceptions, among them George Abecassis, son of a Portuguese father and an American mother (nowadays, incidentally, son in law to David Brown), who once placed in fifteen out of eighteen consecutive races with his all-independent Alta, and was mostly either first or second at that.

Also hard to catch on prewar Altas were A. J. Cormack, young Johnny Wakefield of the Castrol family, Hugh Hunter, Robert Cowell, A. H. Beadle, and of course Taylor himself. To Cowell fell the distinction — not ascribable to Alta influence — of being the only racing driver who ever changed his sex, becoming Roberta Cowell when everyone

First race for the 1½-liter Alta G.P. car at the 1948 British Empire Trophy on the Isle of Man. Car was never fully developed, had checkered career.

least expected it. The others I've mentioned never pulled anything quite as piquant as that, but in November of 1934 Cormack broke the Class G lap record for the Brooklands Mountain circuit in total darkness; as the previous holder was Dick Seaman, this wouldn't have been a bad performance even in broad daylight. Cormack didn't deliberately choose blackout conditions — it was the last day before the track's seasonal shutdown and he just took his place in a long queue of record candidates. All the others failed.

In later years, after the establishment of a third permanent circuit at Brooklands—the Campbell course — Taylor and Abecassis both etched the name Alta on the roll of Class E record holders for this short but teasing itinerary.

Brilliant commercial success doesn't often go hand in hand with the Lin Yu Tang brand of philosophy practised by Geoffrey Taylor. When your blessings come in the disguise of misfortune, and vice versa, you just naturally learn, like the man who wrote that old Bowl of Cherries lyric, to live and laugh at it all. Who but Taylor, for instance, could ever have won an automobile race *because* he broke his track rod? The dice in question was a handicap on a one mile grass track. In accordance with the small capacity of his equipment (he was driving an 1100 Alta) Geoffrey was despatched first, or anyway early, and maintained his lead for a few laps. It had recently rained in torrents and the track was aslurp with mud. Then, just as some of the bigger and faster iron was getting onto his tail and shaping to pass him, his track rod broke. But to his surprise, he quickly realized, that, in the state the track was in, he could steer the Alta just about as effectively with one wheel as the others could with two. Better still, by some odd gyroscopic phenomenon, the *un*steered front wheel assumed an attitude where, on successive turns, it showered gooey mud full in the faces of those attempting to come by. Discouraged after awhile, and anyway blinded, they dropped back anon and let him have the damn race.

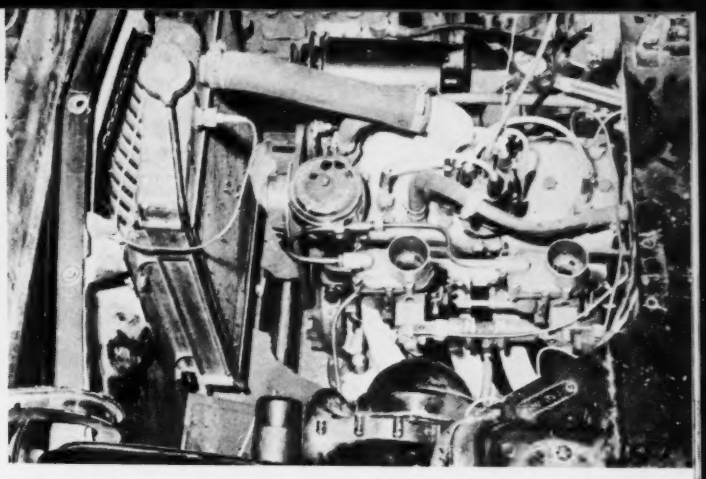
As far as I know, Geoffrey Taylor was the only manufacturer in history who ever guaranteed his racing cars against damage sustained either in or out of competition, crash consequences excepted. The sole stipulation was that owners were required to bring their cars to the factory at prescribed but not onerous intervals and submit them for inspection on the stitch in time principle. It isn't recorded whether anyone ever took him up on this bond, and if so, whether he paid out on any engines that had been broken in with their pans down.

Taylor acquired the rudiments of engineering at his English boarding school, partly on the curriculum and partly by burgling the head master's garage and dicing his car around the grounds, *sotto voce*, at dead of night. Not *sotto voce* enough, alas. Caught in the act, he was expelled, and devoted the next few years to making and marketing hopup conversions for motorcycles. Then, in 1926, he conceived the idea of building a car in his spare time. Just one, for personal use. It was, he figured, going to have to last him a long time, so at least it had better start life up to date. He therefore designed a DOHC engine with a light alloy block, head and crankcase (these were all separate elements), wet-linered cylinders, hemispherical combustion chambers, 90-degree valves, roller bearing mains and big-ends, twin carbs. Its crankshaft was the one we found him sawing from the solid at our story's opening. Possessing an old 4-inch lathe but no power to drive it, he bought a secondhand rotary paddle motor and tapped it into the main water supply line to his parents' home at Kingston on Thames. In the intervals between his turnery operations, the senior Taylors grabbed a quick bath while there was anything to bathe in.

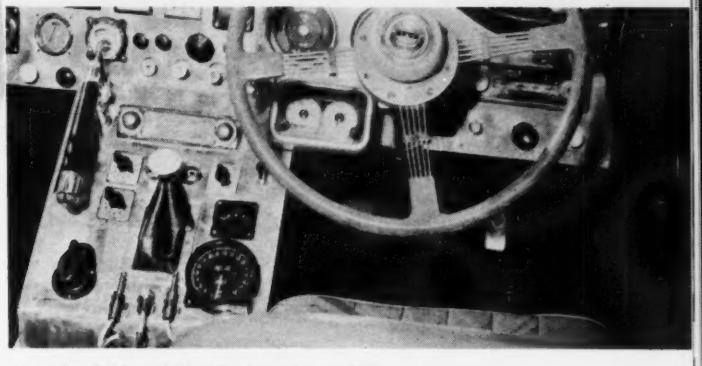
As far as was humanly possible for an amateur with laughably sparse and crude equipment, the creation of this original Alta was a first-person-singular operation. Taylor made his own detail drawings of every last part on the car, carpentered all the patterns for cast components, built up the road wheels, beat out the body, did his own welding on such items as fuel tank, chassis frame, countless odd brackets, etc., made many bits for the electrical system, wired the rig throughout, taught himself the arts of upholstering and spray painting and applied the knowledge.

The complete machine, not merely the engine, was ahead of its time —a standout for stability due to its extremely low build, eyecatchingly racy in appearance, stiff as a little bridge, and with not an ounce of metal wasted anywhere. To keep the whole thing low on the ground the frame members passed under both axles, with the semielliptic front springs immediately above and parallel with the chassis; this, of course, put the shackles into tension instead of compression, a unique feature as far as I'm aware and one enabling lateral rigidity and light weight to be effectively combined. Rear springs were quarter elliptic. Typical of Taylor's economy with stones for killing birds was the use of a single rectangle of sheet alloy to serve the double purpose of cockpit flooring and driptray for the engine-gearbox unit and transmission. This simply slotted into the channel section frame longerons from the back and, by giving the car a perfectly flat underbelly over almost its whole length, was probably worth an extra 3 or 4 mph as antidrag lingerie.

(Continued on page 78)



Left: Around the world wagon gets its shake down run in a down under trials event. Above: Power plant has been suitably modified to cope with expected rough going. Mods include twin solex carbs, special high-compression head, and heavy-duty valve springs. Below: This is really a case of "many extras." These include tape recorder, short wave radio, electric coffee makers, burglar alarms, and refrigerator.



ESCORT AROUND THE WORLD

by C. N. Arvidson

► On May 25th a Ford Escort with various "foreign bits" and much sign-writing arrived in Auckland, N.Z. to be loaded aboard the "Orsova".

This vehicle had already been driven from Northern Ireland through Europe, Asia, India and Australia to New Zealand, a distance of 12,275 miles in 105 days. The speedo reading when the Escort was loaded on board was 43,500 miles and there had been no major replacements.

Fourteen British firms and one French, one German and one Dutch firm supplied equipment for the first part of the expedition to New Zealand.

The owner, Mr. Richard Draper from Northern Ireland is making a round the world expedition called "Ecurie Spa Trans World Expedition" and when the vehicle is unloaded in Vancouver the driver and New Zealander Arthur Thompson will set off for Alaska, inside the Arctic Circle. Caterpillar tracks for the rear wheels and skis on the front will help them to beat the snow problem while in this region.

From Alaska the expedition will go by devious routes to Cape Horn, then up the other South American coast to Central America, U.S.A. and Toronto, Canada. At this stage of the journey another sea trip takes them to South Africa where they will press on through Central Africa and the Sahara Desert to the Mediterranean. After that there will be the final boat trip back to New Zealand from Aden or Port Said.

Modifications have been made and many extras taken along to make life more comfortable. Heavy duty shock absorbers have been fitted all round and other suspension modifications consist of special Monte Carlo springs and an anti-roll bar in the front with heavy duty springs and stabilizing bar for the rear axle. The standard size 5.20/13 tires have been replaced with Town and Country 5.90/13, giving slightly higher gear ratios and improved traction. A Handa overdrive has been fitted giving six forward and two reverse speeds. Typical speeds with this set up are: 1st — 20 mph, O.D: 1st — 30 mph; 2nd — 40 mph; O.D. 2nd — 50 mph; and so on. Acceleration is amazing considering the weight of more than one ton with which the 1172 cc engine has to cope.

To help on the performance side an Ecurie Spa four branch extractor exhaust and twin Solex manifold is fitted along with a gas flowed high compression head. Heavy duty valve springs keep the valve bounce rpm to 7000 and the way the vehicle pulls away from 20 mph in O.D. top proves that tractability has not suffered. Braking has been taken care of with heavy duty linings and have proven satisfactory to date.

As can be seen in the photographs, many extras are carried and a description might help the reader to sort these out. Starting on the outside at the front the first thing to meet the eye is a small but powerful winch belt driven from the engine.

Next is a steel tube protection bar and mesh grille over the headlights. Twin fog lamps are mounted in front of the grille and an 80-watt long range driving light takes pride of place on the front edge of the roof. A swivel spot light is at hand for the navigator. Twin 2-speed electric windscreen wipers are extras to the standard vacuum wipers and an external sun visor will assist the driver in his task. A large roofrack is capable of supporting the vehicle if it gets into difficulties. Along the sides are twin suction horns which will move "Sunday drivers" in quick time. On the driver's side are two

(Continued on page 92)

THE HARD WAY

by Henning B. Dieter

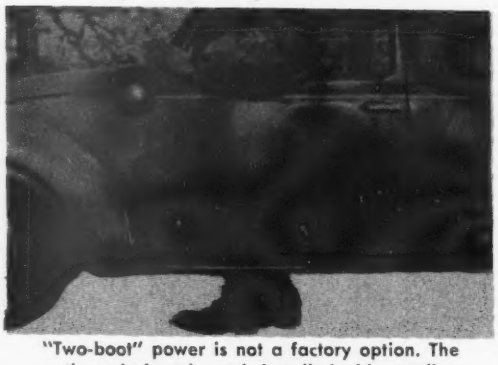
► Does your car start at the press of a button? Did you obtain your last inspection sticker without physical exertion, mental anguish or bribery? Will a qualified mechanic service your engine without loud guffaws? Did your dream car cost you half the price of a comfortable home? If the answer to any of the above questions is "yes", then you are not an auto-sport but just another motorist. A speed boat driver is not a yachtsman, nor should motorists be confused with car sports. The word "sport" connotes gambling, self participation, physical exertion, adventure, skill, prowess, ingenuity, and amusement. If your driving lacks these essentials and you simply use your automobile to drive from one place to another with monotonous regularity, you may consider yourself only a motorist, and an amateur at that.

Perhaps deep reflection on the psychology behind the above paragraph may indicate why the writer was unable to say "no" when faced with the not altogether lucrative opportunity to purchase a badly battered 1947 Volkswagen at a local junk yard.

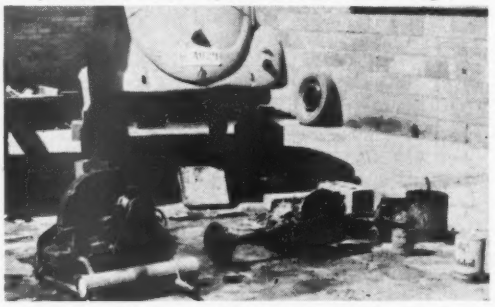
Actually I have wanted a beetle for years and years, ever since missing my first opportunity to buy one at an Army Exchange surplus sale in Frankfurt am Main in the self-same 1947. "Over 300 Used Volkswagens for Sale" read the ad in the "Stars and Stripes". "Priced from $250 to $350, First Come First Served. Sale Starts at 0800 Monday Morning". Since I was very cunning in those days and knew a bargain when it came along, I drove my army surplus amphibious jeep with the bow and stern cut off to Frankfurt from Wiesbaden Sunday night to be sure to be among the first in line. It didn't work. The parking lot in front of the Army Exchange warehouse was a veritable hobo jungle of Quartermaster Corps Commandos who had been bivouacked there since Friday night, all carefully guarding each other's place in line, three hundred and fifty strong, and well provisioned with cash. I made a point of looking over the automobiles carefully before deciding that they weren't worth the money after all. In the next twelve years I waited patiently for the world to wise up and the price to come down. It finally happened. I purchased the beetle of my dreams about a year ago for the reasonable price of $240 cash.

Only a fool would buy a car that doesn't run, so I insisted on a demonstration. It was explained that the battery was dead, and that the clutch was slightly out of adjustment. But the car had obviously been run in the recent past because it still had current license plates from the state of Maine, as well as a US Army in Europe registration document. I accepted mine host's kind offer to push the car for a demonstration before I realized that he meant to push it with another car, rather than by hand, and by then it was too late. He was right behind me in a veteran Austin Sedan, and like the lady in the now ancient joke, trying desperately to get me going about 35 miles per hour, or let's see, ⅝ mile equals 1 km, so 1 mile equals 8/5 km, therefor 35 miles is 8/5 times 35 or 56 km per hour if you prefer. By this time the engine was running, but the rear bumper had become disengaged at one end and was dragging on the ground. It might be mentioned for the uninitiated that the bumpers we see on European automobiles are not generally used for bumping in the American sense, but are more in the nature of trim or ornament. In the case of the VW they are simply bolted to the inside of the fender, since that is the most economical place to bolt them. After shrewdly calculating that the bumpers were not an essential part of the running gear, and could easily be removed, I refused to be diverted by this apparent catastrophe, or the secondary failure which had occurred in the attached fenders, trunk lid (or rather engine cover, hood, or bonnet, since the engine is in the trunk) and stop lights. I concentrated intently on the sound of the engine in order to determine if there were any burned out bearings. I detected only a smooth whirring sound resembling an eggbeater or a sewing machine. Having decided that the engine was in excellent condition, I paid the man his stipend and scampered merrily on my way. Since I was already the owner of a 1951 Borgward Hansa, the idea began taking shape in my mind that I would become a collector of fine, imported, antique German automobiles.

It soon became obvious that a few minor adjustments would have to be made before the people's car would be quite up to what may be called American people's standards. The first obvious trouble was in the braking system, or rather the lack of it. Since the clutch would disengage only with great difficulty, it was impractical to stop the car with the usual expedient of shifting into low gear, or when necessary, reverse. And since the motor wouldn't start with a dead battery it was impractical to stop the car by cuting the ignition, so the brakes had to be fixed. A spot check under the car with the aid of a dental mirror revealed that



"Two-boot" power is not a factory option. The author designed, and installed this sterling accessory as well as the fire gong mounted just ahead of the upper left-hand door hinge.

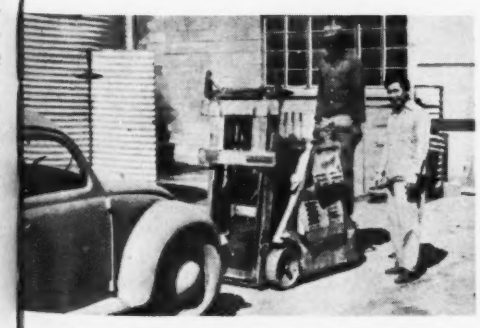


"Just like in the shop manual." An exploded view —exploded by brute force that is—of the VW rear end. Tired beetles make great vehicles for backyard tinkers to work out on due to simple design.

A good coat of paint hides a multitude of sins. "Who said Volkswagens don't give milk." Actually, demon car painter is crouching to give right-rear fender extra attention.

The finished product complete with shiny hub caps. Absence of chrome strip at waist line makes restored VW look shorter and higher than later version. Volks Car #1 looked like this.

Orphan VW was purchased for the grand sum of $240. Rear bumper was lost when car had to be push started to display the health of its moving parts. Nothing deters a collector.



Restored 1947 VW has to work for a living. An accessory not sold through your local VW dealer—a World War II German helmet.

the brakes were mechanical and not hydraulic. They were therefore within the operating range of a do-it-yourself tool box complete with a collection of German taps, dies, and wrenches. The job was under way without any hesitation, but was complicated by the fact that German wrenches are notorious for not fitting German bolts and nuts. A wrench to fit a nut exactly 14-millimeters in diameter is called a number 14 and measures exactly 14-millimeters. A 14-mm wrench will theoretically almost fit a 14-mm nut, but in practice fits only with the aid of a hammer or a hydraulic press. The engineering behind the development of this system of nuts and wrenches can only be understood by those who have had long years of experience or have studied the traditional German or indirect approach to engineering problems. In short it may be explained that the bolts, nuts, and wrenches developed by the German machine tool industry are contrived with Machiavellian cunning to sabotage the French or metric system of measurements in favor of the English, because an ordinary 9/16-inch wrench fits the bolt in question with no trouble. Once the elements of the indirect approach are mastered, it becomes a simple matter to repair the mechanical brakes on the 1947 VW. In this case there was no need to waste any time looking for an adjustable nut to take up slack in the brake cables, or tracking down the linkage between the brake pedal and the drums. It was noticed that each cable housing fit rather sloppily into a bushing in the side of its corresponding brake drum. The cable housing could be pulled in and out of this bushing or receptacle about one inch on each wheel. The obvious (indirect) solution to the problem of taking up slack in the brake cables was to cut four small strips of brass ½-in. wide by 1½-in. long, and bend them with a pair of pliers into the shape of a "C" or a half moon or a crescent. Each of these brass clamps was then simply crimped over the portion of the brake cable which peeped out when the cable housing was yanked back away from the brake drum. This was done in about the same way as you sometimes put ten or fifteen washers under a bolt when it is too long, except that in the case of the brake cable you have to use a "C" shaped washer because the ends of the cable are not exposed, or even explored. After the slack or bight in the cable was taken up, final adjustment was made by sawing off a piece of a 2 by 2 long enough to reach from one's

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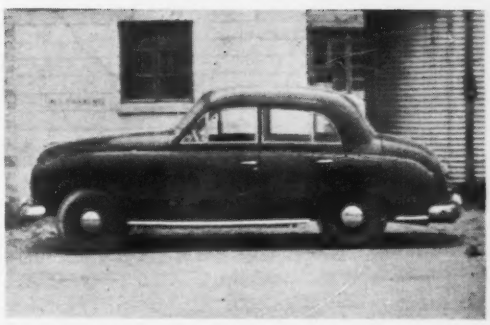


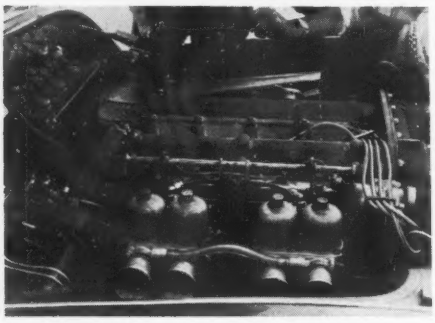
Still another automobile in car collector Dieter's fleet is this 1951 Borgward Hansa. This vehicle started him on the quest for old German runabouts. Early Borgwards looked like U. S. Kaisers.

A staff conference of the Dieter Almost Vintage Car Club pause over a brew before deciding what needs fixing next. Late model command car left is always ready for emergency calls.

A notable part of the Dieter collection is this 1944 boat-tailed Ford. Author's pet pooch demonstrates visibility through rear window.

The Tr 3-S At LeMans

by Richard and Harriet Olguin



► Stop-watch in hand, Ken Richardson, competition manager for Standard Triumph, paced back and forth in front of the Triumph pits at Le Mans. His only remaining car (#27) had just limped out of the pit area with dwindling oil pressure. The mechanics had worked frantically for a precious 10 minutes trying to ease the ailment. There was just one hour and forty minutes to go in the "24 Heures du Mans" and the new Triumph twin cam entry was first in class, seventh overall. Richardson knew the Triumph would be passing the pit in a little less than five minutes. But the minutes stretched to ten, then fifteen. The pit phone rang. Car #27 had pulled over on one of the back stretches with a burned out bearing. The driver was walking back. It was all over. All three cars were out. As a consolation prize, however, there was not an engine failure that could be attributed to the prototype power plants in the trio. Car #27 was brought to a halt by a sheared oil pump drive.

This was the frustrating climax of six months of hard work. Six months spent preparing three prototype cars, with untried new engines except for bench tests, for the big race. But the Triumph story is an interesting one, nevertheless, since there are so many Triumph owners in America and a new model could soon be within the economic reach of many. We were informed by factory sources at Le Mans that a production model of the new car, known as TR 3-S, could start rolling out almost immediately. The works are all set up to produce the car, but were awaiting performance results at Le Mans. In our opinion the car proved itself, and we intend to hold our TR 3 for a trade-in. Standard-Triumph executives were very pleased, too, and are making plans to keep the competition model active while they debate the marketing date of a production model.

We arrived at Le Mans three days ahead of the race, just in time for the first practice session. We headed straight for the Triumph pits quite anxious to see the new cars. At first glance we were a bit disappointed, since there were few obvious body changes on the TR 3-S. It was pointed out, though, that the car was designed slightly lower and longer, with an oil cooler opening under the grille and air scoop vents near the back fenders. To accommodate the new engine, the wheelbase was lengthened 6 inches and the front of the TR 3 stock body was conveniently extended with a fiberglass nose.

However, when the mechanic opened the hood, we looked into a brand new world. The outward appearance of the new twin cam engine is one of massive ruggedness further enhanced by two S.U. dual choke carburetors of the type originally developed for the Coventry Climax engine. The new powerplant is of wet sleeve, aluminum alloy sandwich construction with a cast iron crankcase. It consists of six layers (sump cover, sump, crankcase, cylinder block, water jacket and cylinder head) held together with bolts that run from the bottom of the main bearings to the cylinder head. The engine has five main bearings and the bore is larger than the stroke (90 x 78 mm). The valves are operated by inverted bucket-type tappets and the valve covers are made of magnesium. The construction of the timing mechanism is such that the cylinder head can be removed without disturbing the timing. The 1985 cc engine, which is slightly heavier than the TR 3 unit, develops 158 bhp at 6800 rpm and pushed the cars at well over 140 mph on the straightaways. The steering and gear box are the same as in the TR 3, and so is the rear axle ratio. However, a heavier type of live rear axle is used, and the new cars are equipped with the BRM multiple dry disc type clutch. The standard TR 3 frame is substantially strengthened, while stronger springs and stiffer shock absorbers have been used all around. In addition to a sway-bar in the front, the car was given disc brakes on all four wheels, the rear brakes being cooled by the two air scoops at the rear fenders.

As must be obvious, the cars at Le Mans were built strictly for competition. You can be sure that the production models would have to be tamed considerably. And the drivers, who were quite enthusiastic about the new car's handling abilities, pointed out repeatedly that there is just no possible comparison between the TR 3 and TR 3-S.

First practice runs found the three Triumphs, #25, #26, #27, out on the course checking full consumption, tire wear, etc. The pit crew watched with marked tension that spoke of earlier trials and tribulations. We learned that at a much earlier special practice run, allowed at Le Mans for the first time, car #27 had developed some engine complications. But the Triumphs were letting by-gones be by-gones, and lapped the course in fine condition at an easy 100 mph pace. We could almost tell when a Triumph passed with our eyes shut, for they had a distinctive whistling sound. It was explained that this was created by the wind entering the oil cooler grille. As a result, the boys who worked on this model nicknamed it "Whistling Sabrina". Thursday, the second practice evening, Ninian Sanderson came up with the team's best time, lapping the course at 4 minutes 49.8 seconds, approximately 103.9 mph. Nevertheless, car #27 again developed engine bothers which kept the mechanics working straight through Friday and Friday night, removing the head and overhauling the engine.

Friday morning we looked in on the Triumph drivers, who were comfortably quartered in an English-looking inn in the French hamlet of Torce en Vallee. The line-up had already been finalized. Car #25 was given to Ninian Sanderson and Dick Stoop. Sanderson, who spends most of his time in Jags, was supposed to quit driving last year but evidently couldn't resist. Stoop had brough his own Lotus Elite to Le Mans to be driven by Doug Graham and Mike McKee, but the mechanics smashed the car beyond hope leaving the circuit after a practice run. Car #26 was driven by Peter Bolton and Mike Rothchild. Mike is an American driver seen often around the Eastern circuits and almost always at Sebring in a Morgan. Car #27, the first of the prototypes to be built, was assigned to Peter Jopp and Claude Dubois, a young Frenchman avec blooming bride. Peter Jopp was joined by his father at Le Mans, who is well-known in London sports car circles as often the oldest, but most formidable contestant in the toughest English rallies. Ken Richardson, the crew's manager, has in past years driven in and with "the best of them."

The day and hour finally arrived – 4 o'clock Saturday afternoon, June 21st. The drivers were lined up across the road opposite their cars. At the signal, they dashed to their machines and a split second later the roar of 53 highly-tuned engines rolled over the expectant spectators. A few cars lagged behind, refusing to start instantly. One of these was #27. By the time it did get going, the tail end of the pack was a quarter-of-a-mile ahead. Triumphs #25 and #26 came around lapping the course admirably, at an average speed slightly over 100 mph.

Toward seven o'clock the cars were signalled in for the first change of drivers. Bolton bolted out of #26 first, and after the usual check-ups Mike Rothchild pulled out on the course. He made two laps on the famous Le Mans circuit that had brought he and his wife all the way from America, and a fan blade snapped off and cut through the radiator. Water gushed from #26 and Mike Rothchild was all washed up at Le Mans for this season. As a matter of fact, even if first aid could have helped, the 30 lap minimum for replacement of oil and water prohibited it. Just about the same time Claude Dubois, Bolton's co-driver, came to a sudden stop at another part of the course for the same reason. It seems that the metal of the fan suffered stresses created by the engine vibrations. We tend to think that the effects of these vibrations were multiplied by the fact that the fans were positioned on a shaft that extended 3 or 4 inches from the engine. The remaining car, #27, was promptly called in and the fan was hastily removed.

Car #27 nearly made it. Driven by Jopp/Stoop, the car was surprisingly rapid and at 4 A.M. (half distance) it had gone 139 laps, placing 13th overall. At 12 noon on Sunday #27 had completed 235 laps and was in 7th place. In the 22nd hour of the race Triumph was 3 laps ahead of its only remaining contender in class, the Rudd Racing Team's A.C. Bristol. The fast 2-liter Scarlatti/Cabianca Ferrari suffered engine troubles about 10 P.M. Saturday. The 2-liter Cooper-Monaco-Climax crashed and burned about the same time that evening. The Herrmann/Maglioli Porsche 1600, which had been in 8th place, left the race with valve failure late Saturday evening. When the Triumph quietly retired only 16 cars out of 53 remained, and when the race finished only 13 were in action.. The Triumph had hit an average of 97.8 miles an hour and proved that the engine has real possibilities.


DUNLOP
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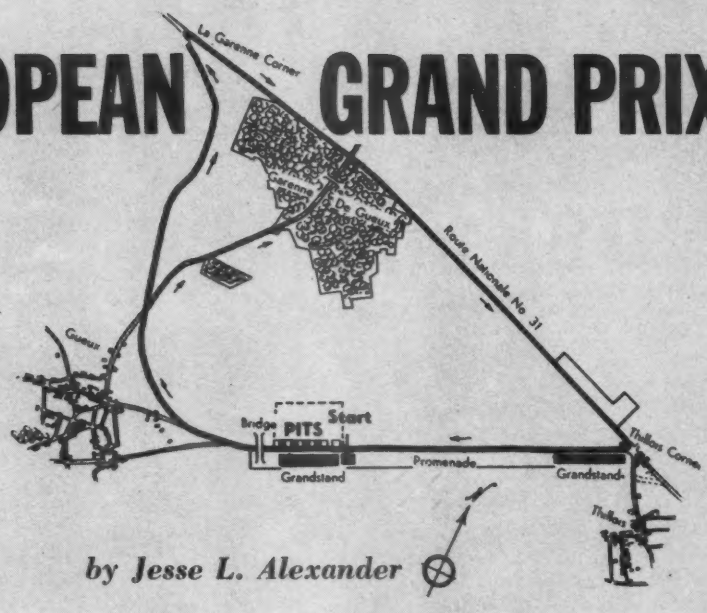
EUROPEAN GRAND PRIX



by Jesse L. Alexander

► After Le Mans, the Reims circuit is undoubtedly the most controversial in Europe. A series of accidents, averaging at least one fatality each year, have brought this extremely fast French road circuit into ever sharper prominence. The races at Reims are organized by the powerful Automobile Club of Champagne and its rotund, fiery and fiercely disliked executive "Toto" Roche. Furthermore, it's been obvious that in the past few years there has been strenuous competition between the A.C. of Champagne and the Royal Automobile Club of Belgium as to which club has THE fastest road circuit in Europe. The Belgian Francorchamps track is different from Reims in that it is much longer and consists of a series of extremely fast (but in FI cars not quite flat out as some journalists indicate) well-surfaced bends. The race average at Francorchamps last year was 129.9 mph. This year at Reims, Tony Brooks' Ferrari averaged slightly over 127 for the 415 kilometer distance, so the Belgians still have the edge.

There's a saying that at Reims all you need is bravery plus a good set of brakes. This just about sums up the situation. If you don't have the anchors to haul up at the end of the long, long, three-mile straight your Formula I car would probably end up in front of Reims cathedral in the middle of the city, and if you don't have the bravery, you won't go fast at Reims. Ok, you need one more item; steam—and plenty of it. You *don't* necessarily need outstanding roadholding; this is the least important attribute at Reims and that, friends, is exactly why Ferrari blew everybody off (well-almost everybody) at this year's Champagne meeting.

Traditionally, Reims has been a Ferrari circuit and with this year's victory Enzo Ferrari was able to add substantial five figure numbers to the credit side of his ledger. Prize money at Reims is fantastic. Top money for the Formula I winner is ten million French francs—slightly more than $20,000, but add to this accessory and starting money plus fastest lap prize and you've got a take home pay packet of at least $25,000 for first man. Team drivers normally split with their "patrone" but even at that a successful weekend at Reims can be most encouraging.

Avarice, then is one reason why everygody goes to Reims each year. For 1959, events had been scheduled for both Formula I and Formula II. Stirling Moss chose to drive a BRM in the former and a Cooper-Borgward in the latter. The car was identical to the other Owen Racing Organization cars except for being painted a horrible shade of light green, this being the color of the British Racing Partnership, said enterprise being run by Alfred Moss and Ken Gregory. The BRP-BRM had been loaned to Moss and Gregory by Alfred Owen, BRM's backer and Stirling will most probably have this car at his disposal for the rest of the year. Whether he will drive it or not is another question, for at Reims the car proved to be slower than the Ferraris though well up to the Italian cars on braking.

A re-worked Vanwall had also been made available for Moss at Reims. Owner Tony Vanderwell had been eager for Stirling to drive the car there, but was disappointed when he chose the BRM. Moss' choice of rides was based on his personal opinion that the BRM was the quicker of the two cars.

Ferrari knew full well that Reims was the one race in the year he couldn't afford to lose. For the '59 race he put cars in the hands of Tony Brooks, Jean Behra, Phil Hill and Olivier Gendebien. For the Formula II race, Cliff Allison was designated to drive the red car, but for some time now, Ferrari has been experimenting with a new cylinder head on the twin overhead camshaft V-6 DINO engine. There were three of these engines at Reims—one was to be in Dan Gurney's first GP car. With his rpm limited to 8000 and driving in his first Formula I event, Dan had resigned himself to doing his best, trying to finish at all costs, but knew full well that the car was an experimental one and chances of its lasting the full distance were not exactly legion. As it turned out, a stone was

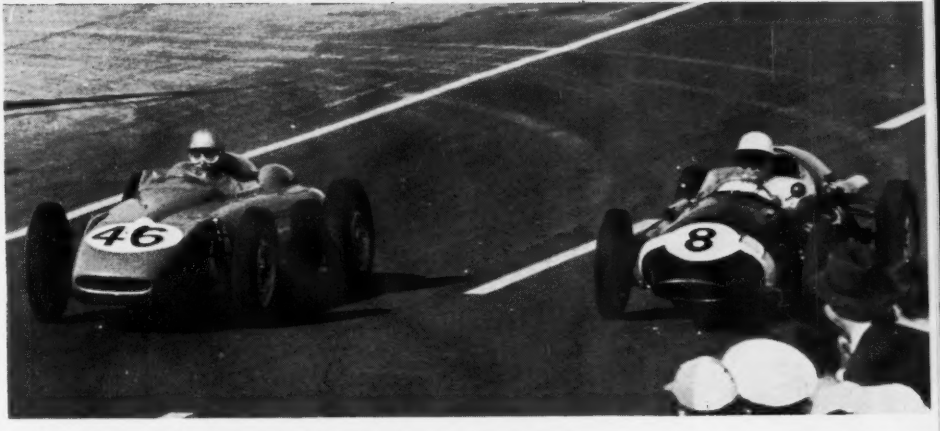
Below: Tony Brooks, who led right from the start and was never really pushed, smiles victoriously.

Right: The start of the Formula II race with eventual winner Moss in front.

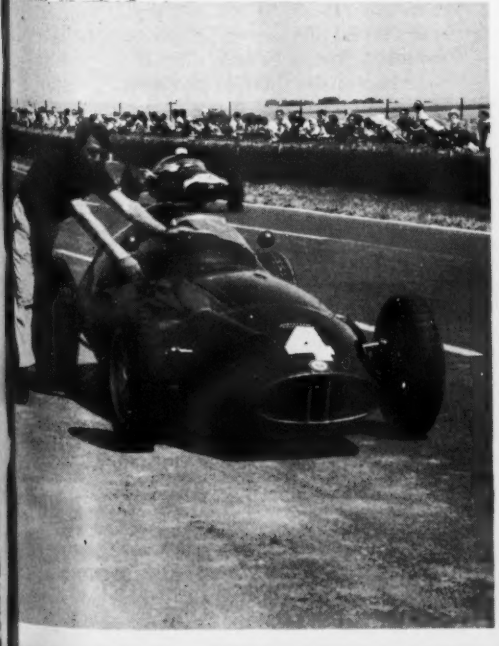
Below: Infighting during the F-2 race. Schell (18), Allison (30) and Bonnier (44) provided a hard fought duel.

Below: Behra in the Ferrari and Moss in BRM dice during practice.

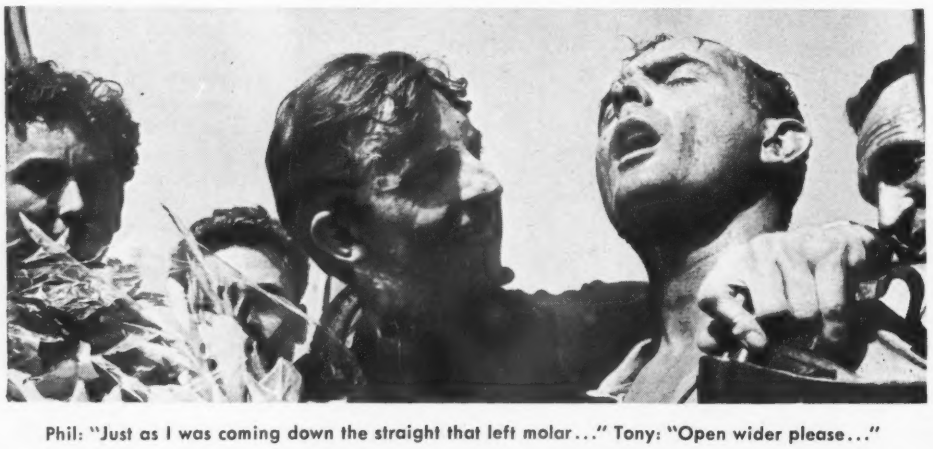
Above: A Ferrari kicks up dust accelerating in practice.
Below: Bonnier pushes the BRM after losing oil pressure.



Above: Hermann in the Porsche (46) and Moss in Cooper-Borgward.
Below: Dan Gurney drove his first F-1 car at Reims this year.



Driver portraits: Tony Brooks (upper left) looks cool and happy after his victory in spite of the fantastic heat. Phil Hill (lower left) was affected more by the heat, which at times reached close to 170 degrees in the cockpits. Dan Gurney (upper right) gets a bit of advice from Brooks. He drove an experimental Ferrari, his first F-1 ride. Moss (lower right) looks pensive during practice.



Phil: "Just as I was coming down the straight that left molar..." Tony: "Open wider please..."

thrown through the radiator at almost half distance and as soon as he saw the temperature go up and the oil pressure sag, he pulled into the pits. Another Ferrari experiment had been the utilization of a somewhat lighter chassis that was based on the Formula II design. This car was not to Jean Behra's liking on the fast Reims circuit and as he had practically free choice of any of the available machinery, the light chassis job was given to Olivier Gendebien who finished fourth.

The Cooper contingent and the Lotus league were all on hand for Reims, of course. The former were surprisingly quick, particularly Jack Brabham, while the Formula I Lotus effort was disappointing following their fine performance at Zandvoort in the Dutch GP a month previous. But aside from the fact that the carburetion never was really right—particularly coming out of the two slow corners—Ireland's car siezed a front hub while Graham Hill unluckily had a stone flung through his radiator.

But the Surbiton machines and more specifically that of Brabham's went faster than anyone really expected. Jack's near-sensational practice time of 2'19.7, only three tenths of a second slower than that set by Tony Brooks made tongues wag in training. Brooks and Brabham are the two chief contenders for the world championship title this year—with the edge going to Brabham. However, if Brooks' Ferrari goes as well at Avus and Monza as it did at Reims, Tony might well surprise us all. As this is written, a strike at Maranello has handicapped the Ferrari factory's efforts in preparing a full team of cars for the British Grand Prix at Aintree although it is expected that Ferrari will do everything he can to at least have one car ready for Brooks.

But what was most impressive at Reims was the demands made upon driver, engine and tires by the heat during the race. Track temperature was close to 200 degrees F—with air temperature hovering around the 95 mark. Temperatures in the cockpits of most race cars reached 170 degrees by half distance. Heat had a telling effect on several drivers. Phil Hill in particular suffered tremendously during the race and if it had not been for a cheering "BRAVO PHIL" sign given by the Ferrari pits, he would most likely have endured just so much and then come in —or had an accident, but he summoned all his resources and drove a great race—finishing second. Towards the closing laps Stirling Moss tried as hard as he knew to catch Hill and was catching up a second or two every lap—right on the edge all the way 'round, but then at the Thillois hairpin, Stirling tried a bit too hard—spun—and stalled the engine, and was unable to restart without outside aid.

Due in some measure to the fact that there was no 12-hour sports-GT race this year at Reims, the track was in near-perfect condition for the Formula I event. However, because of the high temperatures, it didn't take long before the surface began to break up under the wheels of the race cars and flying stones were a serious hazard. All the drivers had cuts on their faces from stones and Ron Flockhart took one in the eye. It's very easy to underestimate what the Formula I drivers put up with in the form of sheer physical

punishment. Every one of the boys at Reims was completely exhausted at the close of the race, except for Tony Brooks who interestingly enough does not seem to expend as much energy as his compatriots. Behra's drive at Reims may well be his last with the Ferrari team. Not only did he muff his start and get away last but he went like the wind in the opening laps to catch up to the crowd. Naturally his engine could not stand the strain (an experimental one at that) and he just pushed it until it broke. There was a slight difference of opinion between him and Team Chief Tavoni following the race—all of which was picked up by the French papers.

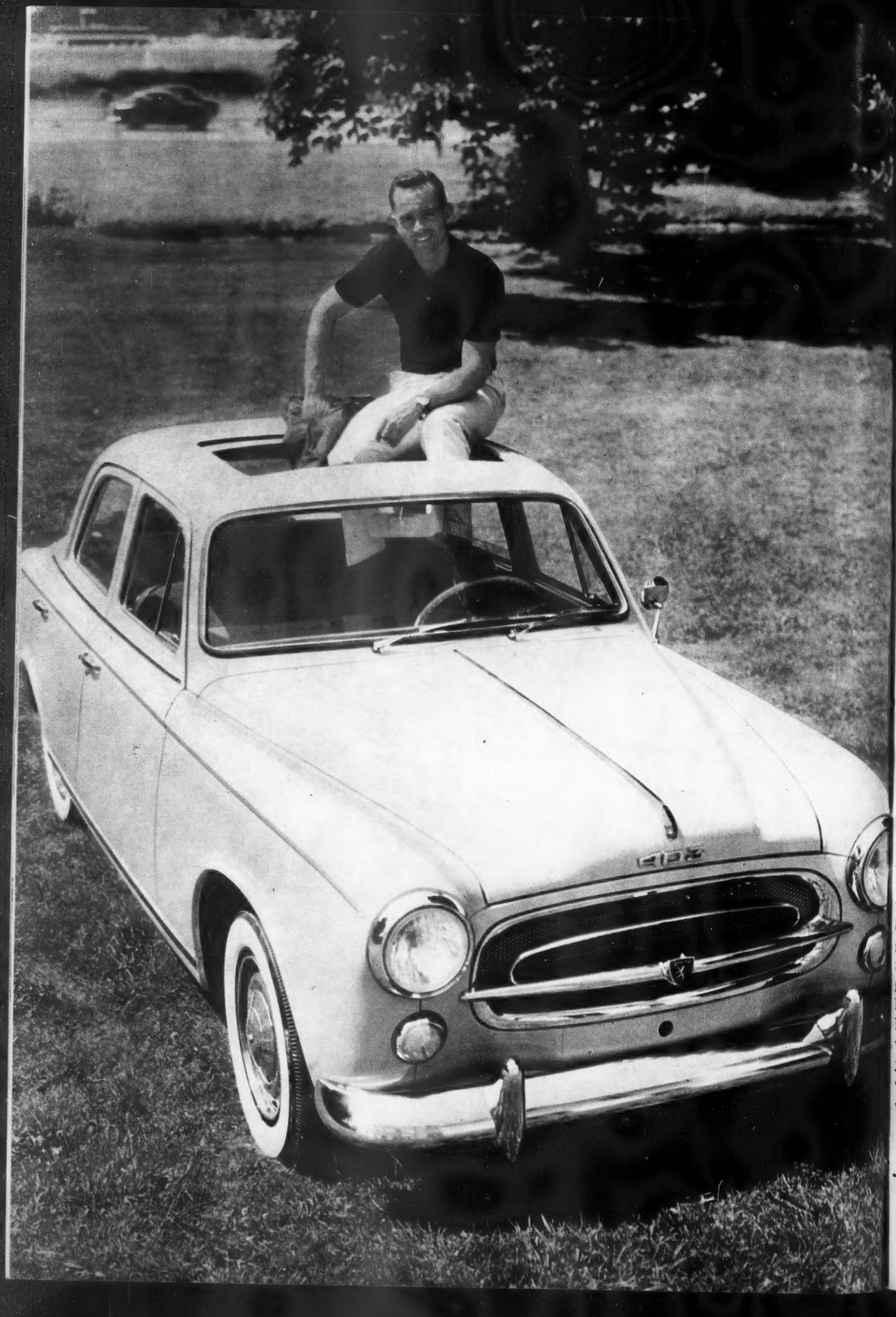
The sound of the Ferrari engines as they were flogged down the long straight at maximum revs (which means anything from 8500 to 10,000 rpm) was probably the most thrilling noise heard all year. The Formula II Ferrari was undergeared on the first day of training and came into the pits with 10,200 showing on the clock. Every one of the Italian cars had 10,000 on the tell-tale by the actual end of the race—the figure having been reached on the starting grid. Tony Brooks' car had its throttle stick open momentarily towards the end and he had to drive on the mag switch until the trouble sorted itself out. Tony led away from the start and never once had to really fight to hold his lead over the pack. His start was beautifully executed, just managing to get that slight bit of lead on the two others in the front row that made all the difference.

The Formula II race turned into a consolation event for Stirling Moss for he won it hands down in the Rob Walker Cooper-Borgward. Surprisingly enough his greatest threat was from Jean Behra's Porsche driven by Hans Hermann. The two works Porsches were disappointingly slow, considering the outstanding performance they put up the year before when Behra walked away from the rest of the Formula II field. One reason was the progress made in the winter months of 1958-59 on the Borgward engine. A long air intake for the carbs was fitted and considerable time put in to exhaust tuning. The unit now puts out slightly more than 150 horses and seems quite happy turning 8000 rpm for long periods. Porsche would definitely seem to be finding themselves surpassed by other 1.5 liter equipment at this stage, and their period of supremacy in this class is, temporarily at least, in doubt.

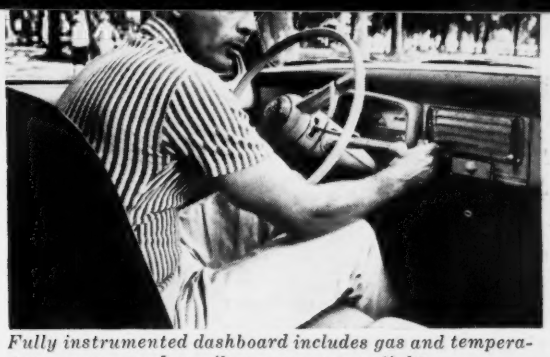
The Formula II Ferrari has a fantastic power output of close to 190 hp and peaks at exactly 9600 rpm! Cliff Allison was handicapped by a poor start in the small car, and never was able to get into the lead. A few laps before the end of the race his engine packed up and that was that for the Ferrari Formula II car. The open-wheeled Formula II Porsche is the second car to be built at Zuffenhausen and replaced the one that Trips wrecked at Monaco.

Fortunately, Reims claimed no lives this year. The famous "flat-out bend" had been ringed with a solid protective barrier on the outside, which certainly did nothing to improve its safety factor. But what we shall not soon forget is the sound of the Ferraris and the killing heat.

—jla



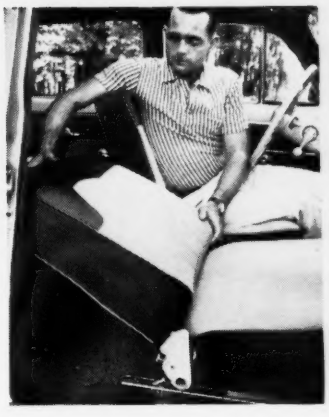
"HILL" TEST / PEUGEOT 403

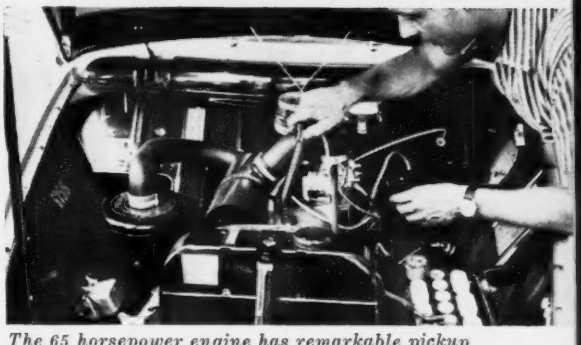


Fully instrumented dashboard includes gas and temperature gauges, and an oil pressure gauge light.

"BETWEEN RACES YOU CAN'T BEAT A PEUGEOT 403"

by Phil Hill





The 65 horsepower engine has remarkable pickup . . . delivers 30 mpg on regular gas.

The separate front seats have a three-position reclining mechanism.

"Ever since I started racing, people have been asking me what kind of car I drive. I imagine they picture me tearing about Europe from race to race in a very glamorous, very fast sports car. They seem surprised when I tell them that as much as I love the world of Sports and Grand Prix cars, I want my normal highway driving to be quick and relaxed. Decidedly so, in fact. And that's one of the reasons I like a Peugeot '403'.

"I like the '403's compact size. It's equally at home on winding Alpine roads, broad highways and narrow French village streets. And it's big enough to carry five or six passengers plus all their luggage—the trunk is really large by any standards. Driving the Peugeot '403' is safe and comfortable. But—and this is interesting—it also has a wonderful combination of riding and handling qualities.

"Another reason I grab a Peugeot whenever I can is the quiet way it performs. Of course, I'm used to 4 and 5 speed machines that require continuous shifting to get the most out of them. But in the Peugeot you drive it just like a 3-speed American car. Then when you get rolling on the road you pop it into overdrive and literally coast along. It's plenty fast enough for me—I'm scared to death to ride with another driver anyway because they always seem to drive like maniacs—just to see what I'll say. (Which is un-printable)

"The final drive on a Peugeot '403' uses the worm and wheel principle (so far as I know, this is the first time this principle has been seen in America since the Stutz of the early '30's). This gives the car a very low center of gravity and eliminates 'floor board hump.' The '403' corners very nicely. At 60 mph, you can set up a turn and let the car track around the curve. The Peugeot has neutral steering. Well, almost. Actually it requires so little force you hardly notice it.

"The Michelin X tires also contribute to the Peugeot's roadability. They stick to the road when cornering yet do not adversely affect the steering.

"This car has dignity. No gimmicky stuff—just good clean lines. I dislike an ostentatious car. The 'unquestioned quality' of the Peugeot '403' (it is really very conservative) is much more to my liking.

"Finally there's the reputation of the marque (the Societe Anonyme des Automobiles Peugeot is celebrating its 70th anniversary this year). There's no car in Europe, even at twice the price, that has a better reputation for reliability, long life and just plain honest quality.

"There's only one little thing I do not like about the '403'. Its ignition lock is sometimes hard to find. Other than that I have no complaints, and lots of hurrahs. I can see why the Peugeot '403' is selling well in the States. This is a fantastic car!"

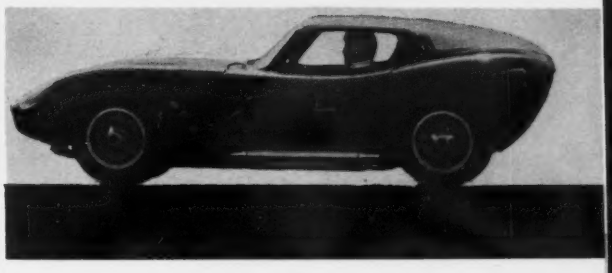
Sold and serviced by over 500 Peugeot dealers throughout the U.S.A. For brochure, write: Peugeot, Inc., 750 Third Ave., N. Y. 17, N. Y.

The Sportsedan from France

PEUGEOT

PRONOUNCED "POOJ-OH"

THE ASARDO 1500 ARS
INTUITIVE AND INTERNATIONAL
TECHNICAL REPORT BY KARL LUDVIGSEN



► By definition a specially-built car is tangible expression of the positive and negative prejudices of its designer and builder, so far as practical considerations allow. First shown to the world at the New York automobile show in early 1959, the Asardo logically illustrates this relationship. With unusual clarity this new car reflects its designer's personal approaches to the machine's various purposes, one of the most important of which is, frankly, to sell.

The company behind the car is the American Special Automotive Research and Design Organization, a name whose initials account for the Italianesque designation of "Asardo". The man behind the company is 29-year-old Helmut Schlosser, an Austrian by birth and American by naturalization. A trained mechanical engineer, he's managed a small machine works and has owned such exotic equipment as a Siata with 1100 cc Stanguellini engine. As a long-time enthusiast Schlosser had especially admired the aerodynamic and aesthetic qualities of certain design details of competition cars, like the frame and door layout of the 300SL Mercedes, the clean snout of the 300S Maserati, and the high Kamm-inspired tail of some Farina Ferraris. He also had a yen for small-sized sports cars of high performance and of conventional front-engined layout, a category in which there was no first-class sports/touring car designed from first principles.

Schlosser realized that he was far from the only one who admired features like these. When he built the Asardo, then, he did it partially to see how its shape would work out but also with confidence that many other sports car enthusiasts would find its lines interesting. By following his own very personal feelings about car design, Helmut Schlosser has conducted an intuitive but effective market research survey on the features most likely to sell a sports car.

Alfa Romeo engine and suspension components were chosen for the prototype Asardo, complete drawings for which were turned out by the versatile Schlosser late in 1957. Before any actual chassis construction was begun the fiberglass body was constructed in its entirety to discover whether its design would be as pleasing as the drawings and small plaster model indicated. From measurements of the model, bulkheads were cut to guide the formation of the plaster mockup, some major changes in the tail shape being made in the process. Schlosser remembers 1958 as "a Summer of sanding", the mockup being brought to glass-like smoothness before the female molds were built up. Of fiberglass, the latter consisted of a small mold for the nose section and a single large mold for the remainder of the body, in which the doors, hood and main body were individually laid up. A heavy, complex "space frame" of wood backs up the massive female mold.

If production of the Asardo becomes possible, smaller separate molds will be made to allow various body panels to be made up individually, one man specializing in, say, a door or left rear quarter panel. The complete body will be glued together from these panels, presumably with the aid of epoxy resins. Availability of separate panels like this should also be an aid to easy repair of the bodywork.

In either case the body will be built up by very conventional methods, yet with carefully studied detailing. After the parting agent is applied to the mold a layer of clear polyester is sprayed in, being about 1/32 of an inch thick after curing. The remainder of the resin used is tinted green as an indicator to guide those doing the final body sanding. If the dust turns green, you're almost into the reinforcing glass layers. A layer of fiberglass cloth is nearest the body surface, backed up by a layer of mat, with additional layers of cloth wherever extra strength is needed.

To ease the removal of bubbles during layup a thinner is added to the polyester, styrene being chosen for this instead of acetone because of the extra body of the former.

For the prototype a Karmann-Ghia dash panel was utilized, considerably modified, and a K-G windshield was also called into service. Cutting this to the proper contours was a task taken for granted by Asardo personnel until the day the car was to appear at the New York show's press preview. Hairs turned gray right and left as one windshield after another shattered in the attempt, one finally being cut and fitted just in time to make the formal show opening. Needless to say, the windshields will be specially cut for Asardo in the future. Similiarly the first plastic rear window was formed over a single male mold, leading to some irregularities which will be eliminated by the use of matching male and female molds now under construction.

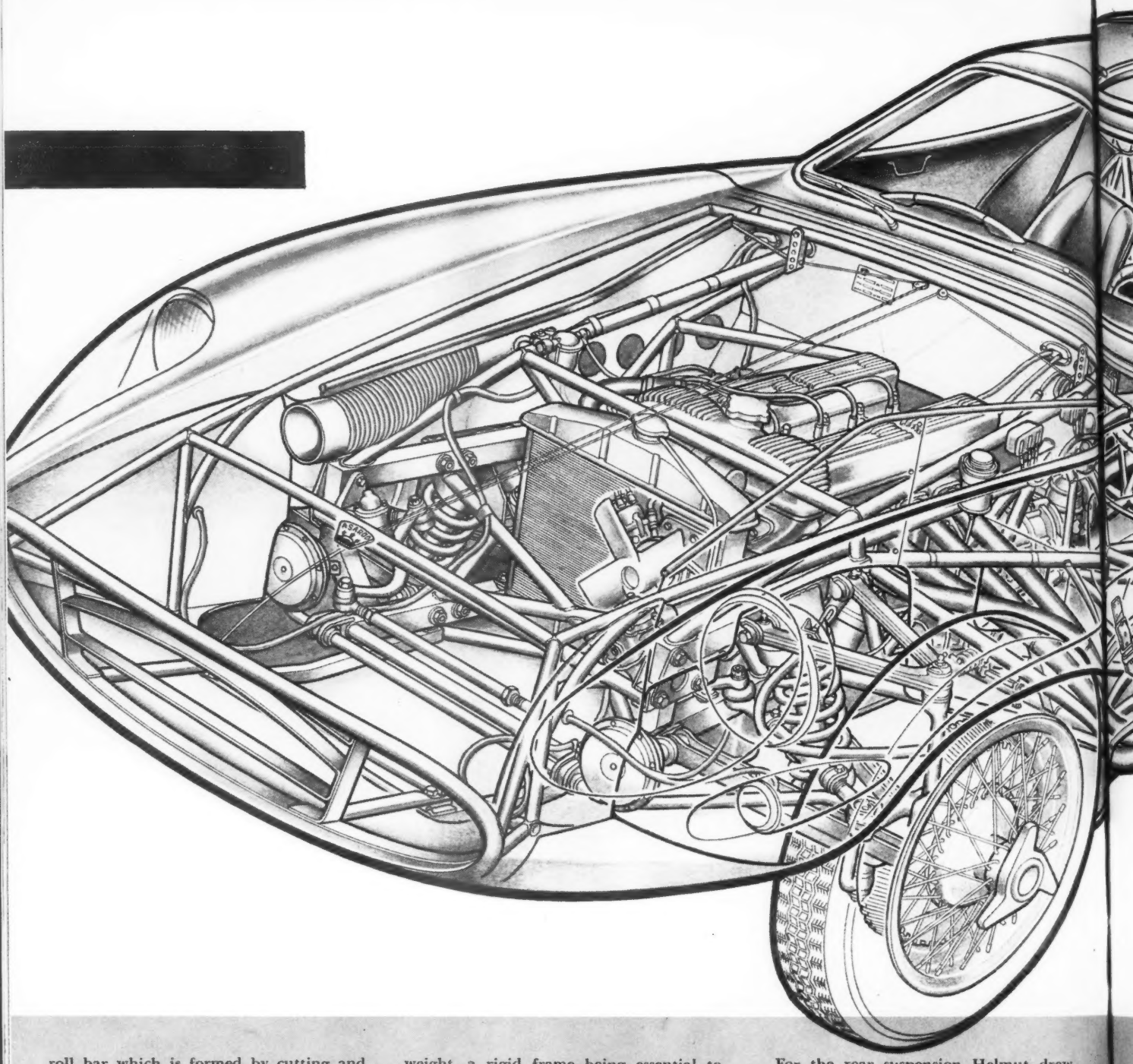
Sensibly Schlosser has decided to use Mercedes-Benz hardware for the 300SL-type doors, so far as the latches and hinges are concerned. To suit the lighter doors of the Asardo special similar hold-open struts are being fabricated. The prototype's doors had a tubular steel frame, but for future cars the structure will be entirely of fiberglass, and will include roof recesses to improve headroom. Side windows will be easily removable as on the SL. Instrumentation may be either by Alfa, as on the first car, or native U.S., while the Porsche Speedster seats will be approximately duplicated, having proven well suited to the car's needs.

The designer admits that great care is needed to ensure that the big forward-hinging hood doesn't flutter or shake, and he has taken this care. The hood literally clamps itself to two tubular frame members at the cowl, and is released by tugging cables from a control within the grille opening. Straps at the sides bind the body together and satisfy competition requirements. Hardware like headlights, tail light units and windshield wipers are supplied by Lucas on the basis of small size at reasonable price.

Though it's never seen the inside of a wind tunnel, the Asardo body shape appeared to be as functional as it was handsome in early tests. After considerable mileage in the rain its surface — especially the tail — remained remarkably clean, always a good sign, and air flow past the open windows was very smooth. Warm air from the engine room finds its way out through a hole in the belly pan for the sump and through the extra-large gearbox and prop-shaft tunnel to emerge from holes at the extreme rear of the underpan. Tests showed that these holes could usefully be enlarged, while there's still room for doubt about the adequacy of the air exit area. Inadequate escape space can lead to a very warm passenger compartment, especially in a coupe. A scoop in the aluminum underpan supplies the rear axle with cooling air, while the engine gets a cool draught through a flexible hose and fiberglass box in the right front wheel well.

When the body was completed, in April of 1958, work proceeded on the rest of the Asardo. As many experimenters have realized one of the indispensables to successful use of fiberglass body is thorough, rigid mounting for the shell to minimize crack-raising stresses. Happily conceived as a unit by its designer, this car features a rugged space-type frame to do just that while bringing along its usual virtues of extreme stiffness, light weight and impressive safety. In fact the frame/body layout illustrates the intensity of Schlosser's preoccupation with the construction of a genuinely safe automobile.

In general the Asardo frame follows the 300SL lead in having a sturdy structure below the door sills, but the details are entirely different. Lateral bracing at the very front is supplied by horizontal and vertical tubular X's, plus a high cross tube behind the radiator that's bolted in place when the engine is installed. Box-section members accept the stresses from the suspension wishbones, those at the bottom extending rearward to the "balanced" engine mounts of the Giulietta unit. In addition to the deep trussed sills torsional strength is given to the Asardo's center section by 1¼-inch tubing down the center of the cockpit over and under the drive shaft. The upswept rear segment of the frame is quite complex, giving fine bracing to the coil spring abutments and radius arm mounts and outrigging the standard Giulietta fuel tank used on the prototype. Outstanding is the continuation of the frame into the roof to give superb rollover protection as well as support for the body. Behind the occupants' heads is a two-inch



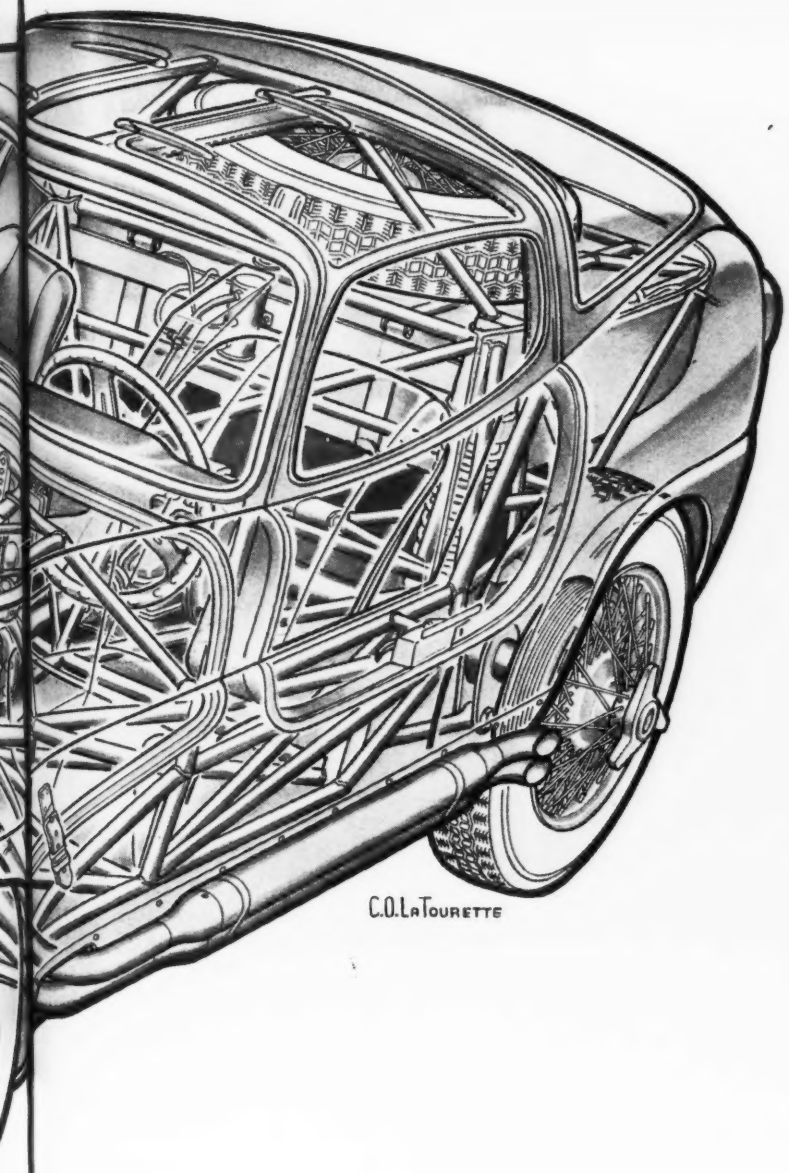
roll bar which is formed by cutting and welding rather than bending and is braced doubly to meet the requirements of any race sponsor.

It's not possible to discuss the frame in detail yet, since many changes will be made in accordance after experience is gained with the prototype. We hope, though, that it will have been possible to indicate the newer design in C. O. La Tourette's cutaway drawing. The frame was originally designed with ¾- and ⅞-inch tubing in mind, but was actually built primarily from one-inch steel tubes in order to ensure that the prototype wouldn't disintegrate and require expensive post-construction repairs. A frame weight of 145 pounds resulted, a still reasonable figure which Helmut plans to reduce to about 125, probably by simplifying the frame design rather than reverting to the smaller tubes first planned. He emphasizes, however, that he'd never endanger torsional stiffness in a search for less weight, a rigid frame being essential to good roadholding and safety. Definite revisions will have taken place on the passenger's side, to obtain more footroom, and at the rear where a new gas tank will be developed to allow the spare tire to be sunk into the "deck" to leave some sorely-missed luggage room. An early scheme to hinge the entire rear window upward may yet be put into effect.

Only partly in jest Schlosser said, "The weight of this car is all in its components! It's astonishing how heavy some of these assemblies are." Indeed the frame and body have been so reduced to essentials that the Alfa engine and suspension parts seem relatively much heavier. At the front the well-known unequal-length Alfa wishbones are found together with inclined coil springs and Koni shocks. To increase the spring rate the coils were shortened by two turns, the frame abutment point being correspondingly lower. Alfa steering is used in its entirety.

For the rear suspension Helmut drew up an independent layout but forsook it on the grounds that it would add overall weight to the car and about $1000 to the price. Also, as he points out, smooth U.S. race courses don't really demand IRS. We hope to discuss more fully later the seeming anomaly that live axles often suffice for racing when IRS may be preferable for long-distance touring. Few better assemblies could have been used than the Alfa axle, with its trailing arm location and light-alloy center section. Originally left alone, the rear coils may also be stiffened to eliminate a tendency to "bottom" on rough roads.

So effective are the Alfa/Girling brakes fitted to the Asardo, in conjunction with the lower and more rearward center of gravity of the new car, that *softer* brake linings may be necessary at the front wheels. Radiant cooling is enhanced by the use of Borrani wire wheels with lightweight 15 x 4½K rims which effect a



ASARDO 1500 AR-S

SPECIFICATIONS

POWER UNIT:

Type	4 cyl., in-line, water cooled
Valve Arrangement	Overhead, inclined, 2 OHC
Bore & Stroke (Engl. & Met.)	3.13 x 2.95 ins (79.5 x 75 mm)
Stroke/Bore Ratio	0.945/1
Displacement (Engl. & Met.)	91 cu. ins. (1485 cc)
Compression Ratio	11.5/1
Carburetion by	2 Weber twin-throat 40 mm.
Max. bhp @ rpm	135 @ 6800

DRIVE TRAIN:

Transmission ratios	Rev. 3.37
I	3.31
II	1.96
III	1.35
IV	1.00
Available final drive ratios	4.1, 4.5
Axle torque taken by	Radius rods

CHASSIS:

Wheelbase	88 ins.
Front Tread	51 ins.
Rear Tread	50 ins.
Suspension, front	Coil spring, unequal wishbones
Suspension, rear	Live axle, coil springs, trailing arms
Shock absorbers	Koni adjustable
Steering type	ZF-Gemmer, worm & ball
Steering wheel turns L to L	2
Brake type	Alfa/Girling, 2 LS front, Al-Fin drums
Brake lining area	264 sq. ins.
Tire size	165 x 15 or 5.90 x 15
Rim width	4½K

GENERAL:

Length	150 ins.
Width	64 ins.
Height	46 ins.
Weight, dry	1500 lbs.
Weight distribution, F/R	50/50
Weight distribution, F/R, with driver	47½/52½

weight reduction over the Giulietta discs. Experiments with tires are still going on but the 165 x 15 Michelin X's have proven well suited to the car so far.

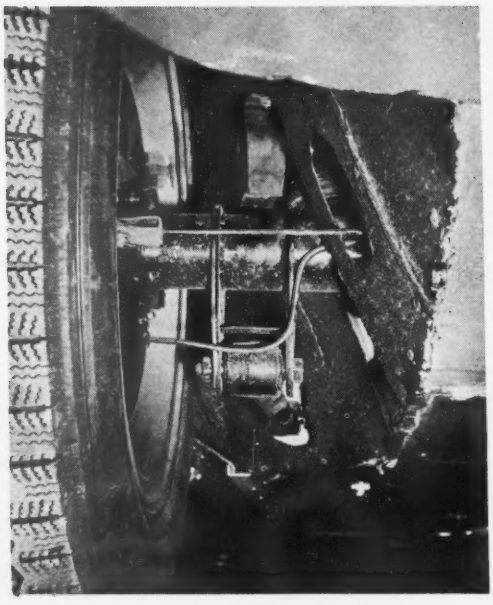
As was the case with the Alfa-Abarth 1000, lest there be direct competition with the 1300 cc Giuliettas, Alfa Romeo asked that Schlosser move his brainchild into a different displacement class. He chose to go as close to 1½ liters as he could by enlarging the Giulietta's bore, leaving the stroke alone. Ultimately the dimensions were 79.5 x 75 mm, a bore increase of 5.5 millimeters giving a displacement of 1485 cc. This was achieved by having special wet liners and pistons made in Germany to Schlosser's specifications. The larger piston was kept near the weight of the full-skirted original by cutting away the skirts around the wrist pin bosses for a slipper-type shape. A thicker crown has deeper valve head reliefs, while thinner piston rings are mounted lower on the skirts. An 11.5 to one compression ratio will be tried at first, on the assumption that it's always easy to go lower if found necessary.

Helmut was ready to go to new connecting rods of wider shank if needed, but the weight reductions accomplished in the piston have postponed that expensive project. The wrist pin remains the same diameter but is internally ribbed to increase stength, it is to be hoped without introducing any unwanted stress raisers. The designer will limit peak revs to 7500, a figure he feels should be dead safe. Maximum power is expected to be 135 bhp at 6800 rpm, though both figures may be a shade high. It will surely deliver 120 horsepower at slightly over 6000, and perhaps more after development and in racing tune.

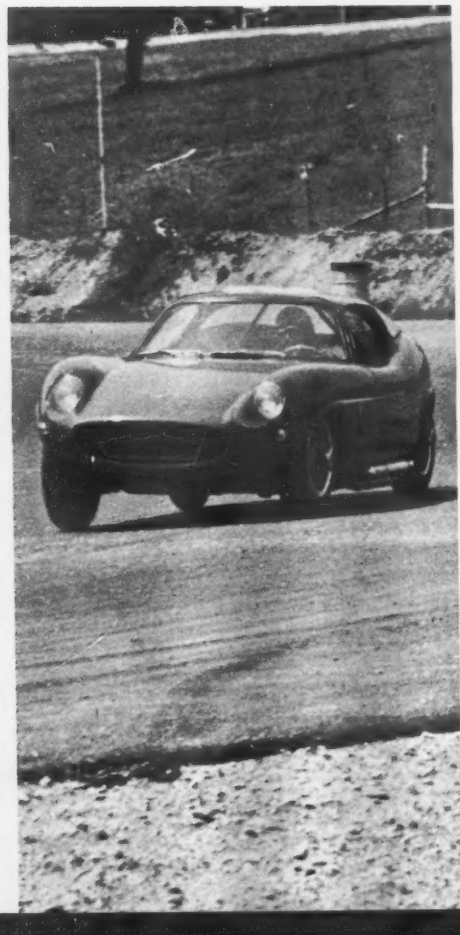
Twin Bendix pumps deliver fuel to Veloce-type 40 mm Weber carbs carrying ram tubes. Exhaust is through tuned manifolding leading to completely special mufflers of surprisingly light weight and high effectiveness, slung along the left-hand side. Within the aluminum casings are three sections: Fiberglas-packed muffling chambers at front and rear and a resonating can in the center. On the basis of price and maintenance the starter and generator are by Lucas, and for the sake of individuality a completely new camshaft cover has been cast.

Schlosser chose the standard four-speed Giulietta transmission, which he prefers to the newer-pattern Alfa boxes, and leaves the ratios alone. For the rear axle, gear sets giving 4.1 and 4.5 ratios will be available.

At 88-inches, the Asardo's wheelbase is 1½-inches longer than the Spider's and nearly half a foot shorter than the Sprint coupe's. The engine is no less than 17½-inches farther to the rear than in the Sprint Spider, a change which has made possible a short, one-piece drive shaft and a dry weight distribution of 50/50. With a full tank of gas and driver aboard 52½ percent of the weight rests on the rear



Right: Alfa rear suspension is used on the Asardo. It proved to be good choice. Trailing arms rigidly locate solid rear axle, while alloy center section helps keep weight within bounds. Below: Gull wing doors use Mercedes-Benz hinges and latches,



Left: The Asardo takes the hairpin at Lime Rock in a flat, all standing attitude. Above: Wrist pin on Alfa connecting rod has been beefed up by internal ribbing.

wheels. Total dry weight now stands at 1500 pounds, between the 1400 of the Alfa-Abarth and the 1850 of the Giulietta Sprint Speciale coupe. Slightly damp at Le Mans scrutineering, a Zagato/Conrero/Giulietta coupe weighed 1682 pounds, while the GT Porsche Carrera coupe is close to 1710. Any way we scrutinize it the Asardo seems to be in the thick of the competition, especially in view of Helmut Schlosser's conviction that he can diet it down to 1400 pounds for racing in due time.

By any standards the first outing of the Asardo was a success. It was decanted from its trailer at Lime Rock without having run a foot under its trial 1300 cc power. After about 30 slow laps for break-in Dolph Vilardi slid behind the wheel for 20 quick ones. As Dolph tells it, "We were only able to get about three-quarter throttle, and the plugs told us later the mixture was far too lean. I kept below 6200 revs and didn't take any rash chances with Helmut's 'baby' but still turned 1:16 laps easily and some closer to 1:15. Using full revs I'm sure I could get down to 1:14 and perhaps to 1:13 when the engine was tuned right. With a Conrero 1300 engine I'm certain we could have turned 1:12." One of the best Veloce Spider times at Lime Rock was Bob Grossman's 1:14.8, while most of the Alfas register 1:16 to 1:16.5.

"Yes, it handled like an Alfa," Dolph went on, "but it cornered a lot flatter. In a way it wasn't as forgiving as a Giulietta, though, and it seemed very sensitive to tire pressures. On braking it stayed flat and steady, didn't nosedive at all. I've never seen a car that went so well the first time out. I wouldn't have changed a thing on it." After Lime Rock the designer took the Asardo on a 600 mile shakedown trip that revealed a few details, but only a few, that needed touching up.

It must be evident to you now as it was to me that the Asardo is not, by design, one of those one-time auto show bloomers built up for spectacle outside and down for an illusory price inside. It's a knowledgeable man's serious project that could be a basis for a fine production sports car. Let us be frank: As I write it is far from any kind of production.

As a result of the motor show Schlosser has firm orders for a dozen cars. If the finance forthcoming is modest this would be the initial output, probably at a sales price higher than the quoted $5875 and at a plant in Weehawken, New Jersey (The original North Bergen quarters were adequate for prototype work only, while the engines were built up in Spring Valley by Ernie Cassis.) With better backing, which may not be out of the question, Helmut visualizes two cars per week on an annual basis, in which case the original price would allow a realistic margin of profit. He has a keen eye for cost-cutting, with no chauvinistic prejudices, and a good sense of the problems of production. If the 1500 AR-S model is a success there are already plans for future Asardos. SCI hopes for both success and a future for The Asardo Company.

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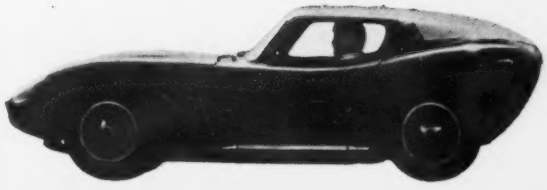
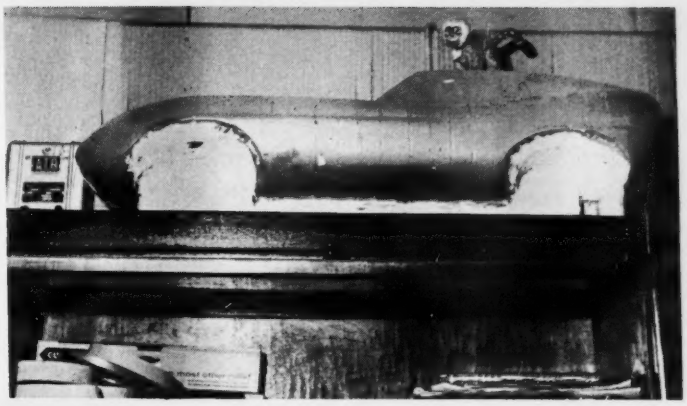
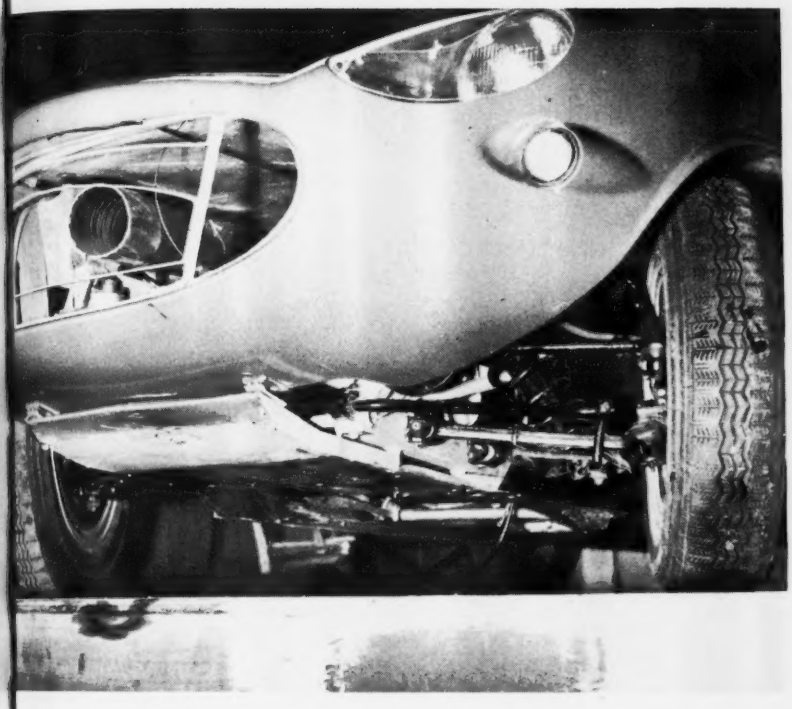
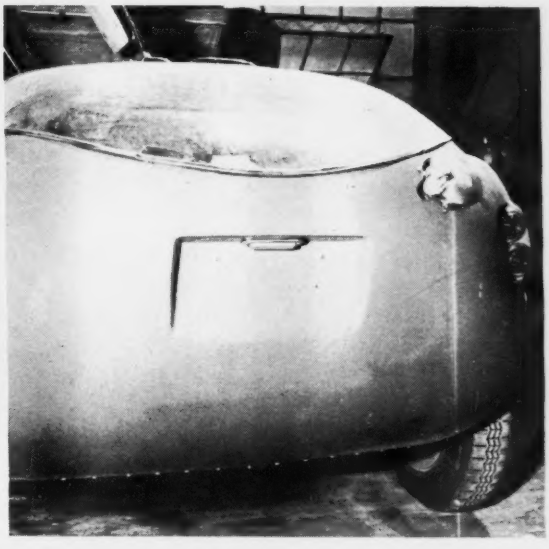




Above: Monkey mascot sits atop plaster scale model used to evolve the lines for the wood mockup. Left: Ancestry of front suspension is easily traced from this angle as Alfa A-frames and combined shock and coil are exposed to view. Below: Bulbose, high-tailed rear of the Asardo blends into the low sweeping nose to form one esthetically pleasing unit. One thing is sure — it is distinctive.

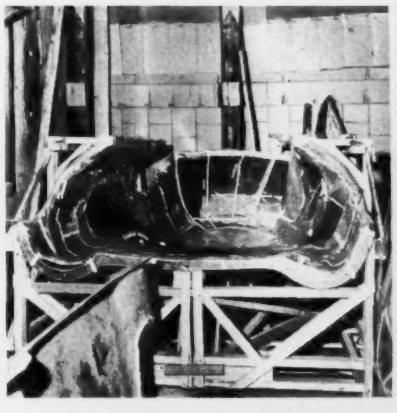




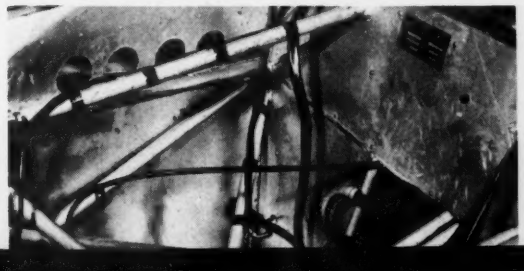
Below: Special sleeves and pistons were made in Germany for the Asardo's tuned Alfa engine. These made-to-measure components upped power plant's capacity to 1½ liters.

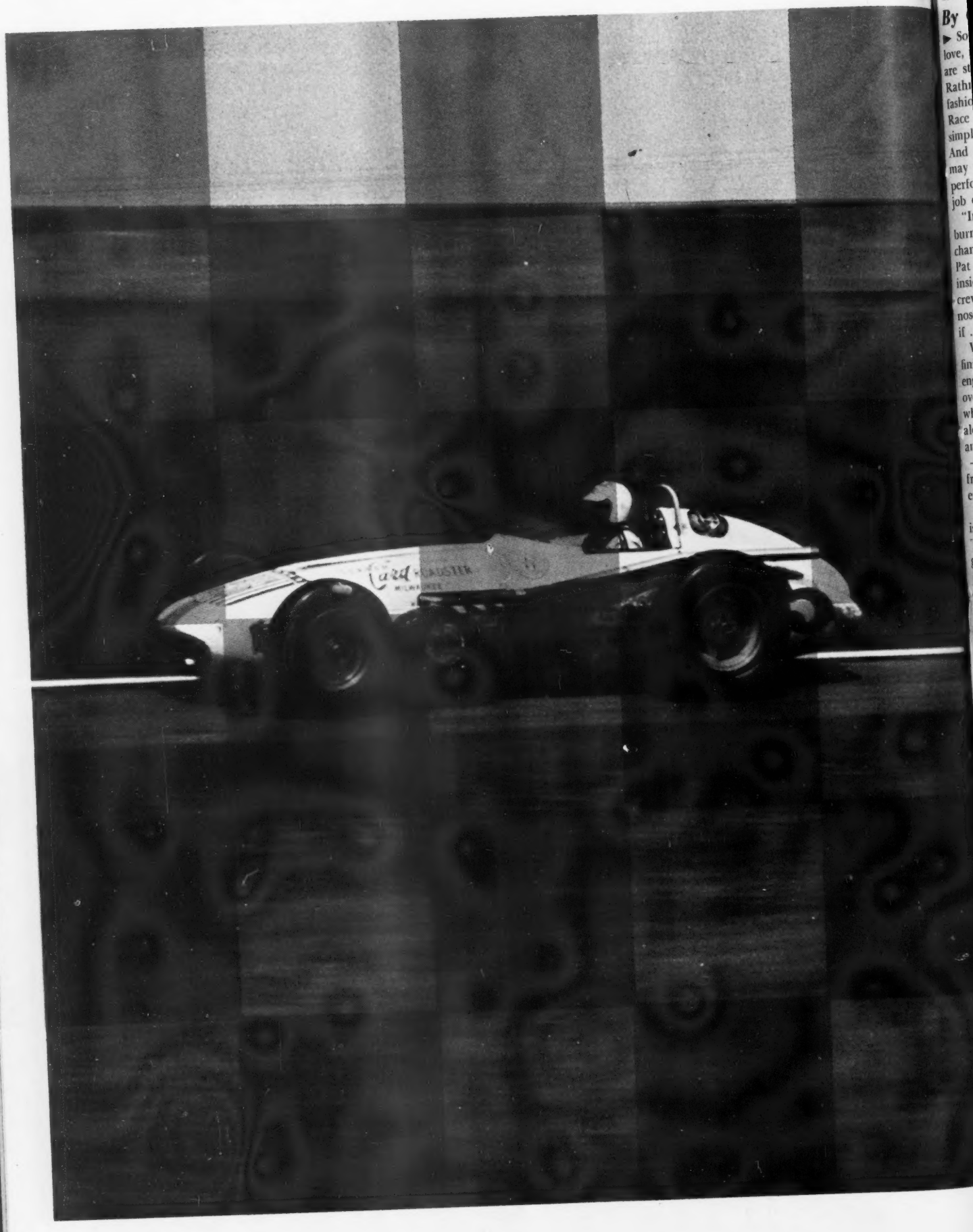
Nose section of the Asardo was built in this female mold. Heavy wood frame work is necessary to keep drying plastic in alignment.

Designer Helmut Shlosser talks about his brainchild to author Ludvigsen during visit to shop.



Tube construction of chassis is evident in this view of the empty engine bay. Designed as a unit, the chassis is extremely stiff, yet light in weight. Right: The throne of power. The driving seat in the Asardo is all that any enthusiastic owner could ask for. Intended for racing, or serious touring, it offers support for the thighs, and the small of the back. Gear lever extends further into cockpit. It was dropped when engine was removed.





INDIANAPOLIS: OLD FASHIONED CAR COMEBACK

By George Moore

▶ Sometimes old fashioned ideas about love, marriage, and how to build race cars are still the best. Rodger Ward and Jim Rathmann's one-two punch with "old fashioned" automobiles in the 500-Mile Race proved rather conclusively that the simplest design often is the best design. And while the more radical equipment may sporadically put on a more flashing performance, it doesn't necessarily get the job done over the distance.

"Indy '59" was a four-wheeled rubber-burning Donnybrook which saw the lead change 14 times; had one of the leaders, Pat Flaherty, park his sled against the inside front stretch wall; and left rival crews shaking their fists under each others noses, proclaiming, "I'd have beaten you, if . . ."

Ward and Rathmann's double-barrelled finish with machinery featuring standup engines has nurtured bitter controversy over the rather standard creations of whiz-kid A. J. Watson which are built along the Watsonian conception of what an Indianapolis roadster should be like —engine standing on the left side of the frame, driver seated to the right, and the entire chassis offset to the left on the axles.

The reason the "versus" issue is so hot is due to a guy named Johnny Thomson. The flying Scotsman from Boyertown, Pa., grabbed off third spot in the latest laydown job, the Racing Associates Spl. And his crew claimed he would have won had not the manually operated weight jacker flunked its driver's test at about the three quarter mark, leaving approximately 250 pounds too much weight in the right front wheel.

Thomson had a device by which he could transfer weight around in the chassis while still on the move. The apparatus was first cabin as long as it worked, but it pooped out at the wrong time. With too much weight jacked into the right corner, the car tended to pivot on the front end when the steering wheel was cranked over for the turns. A slip at this point, and you're out in the marbles — hello doctor, what am I doing here.

The Racing Associates roadster sat on the pole with a one lap track record of 146.532 mph, and posted a four-lap qualification time of 145.908 mph, almost two-miles-per-hour faster than Ward's qualifying speed. A week after the 500, Thomson set a track record of 103.523 mph at Milwaukee with this car, and won the Rex Mays Memorial 100-miler going away.

The automobile was constructed by Lujie Lesovsky who followed the basic tenets of roadster design, but with a twist. The machine has its engine tilted from right to left instead of the opposite way as in other roadsters. The drive shaft runs down the right side, so the driver sits to the left. Lesovsky claims this moves the center of gravity nearer to the center of the car where it belongs. This in turn enhances stability in the corners. Thomson said he could stick the job most anywhere he wanted to, thus the issue of which is the design, standup or laydown, still has not been resolved and will be carried over to 1960.

A pit man with a manually operated wheel jack today is about as ineffectual as a buffalo on roller skates. Indy this year was won on a set of air jacks. The formula for getting the job done in this plant still is stand on it and turn left. However, one bit has been added. Don't sit on your duff in those pits too long, or you'll be riding in last place. The 1950 500 was won on the 169th lap when Ward smoked in for his third and final pit stop, and got away in just 26 seconds. Watson was waiting with a crew trained in split second timing, so the moment he braked to a halt the air hose was slipped over the jack connection, raising the car off the ground to receive four new tires and fuel. He got back on the track so quickly that Rathmann who had been on the same lap all along still was over 20 seconds behind him.

In making an analysis of these precious seconds lopped off the parking time, it can readily be seen that 10 seconds saved per each time of a minimum of three stops will amount to approximately one-half a lap. With the leaders so closely matched, it is impossible to expect a man to make up that much distance on the track. Subsequently, any method which produces a slight advantage is to be exploited to the fullest.

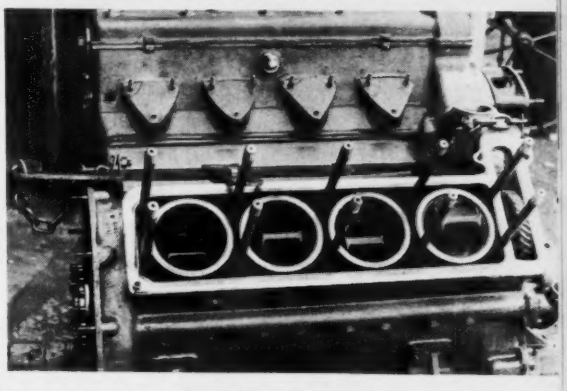
The air jacks used in this year's race are relatively simple devices which have been adapted from aircraft. They are cylindrical objects which look something like a thermos bottle. When compressed nitrogen is pumped into the cylinders via an auxiliary tank, the inner plunger drops down to contact the ground, then pushes the cylinder body which is mounted on the frame up into the air.

To get the car back on the ground, the nitrogen inside the cylinders is released, and the plungers, or jack legs, contract back into the cylinder body. Timing is all-important with air jacks, as the machine must not move forward until the plungers are well up into the cylinder. Should a leg become bent in an extended position, it could not retract and this situation could cost a team the race.

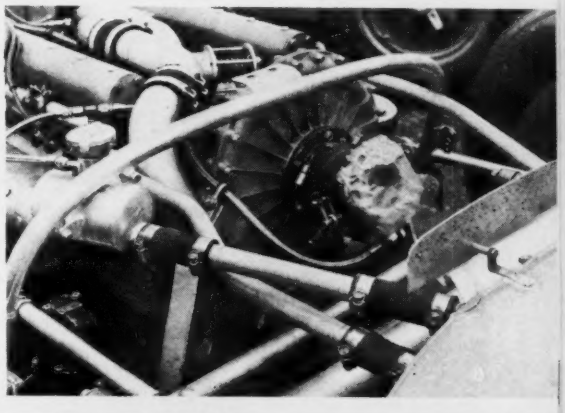
Not only are these air jacks adapatable to race cars, but it's a good bet manufacturers who wish to compete in distance events like Sebring and Le Mans will begin considering them as optional equipment on their "chariots du sport". In a 6, 12, or 24-hour operation where numerous pit stops contribute greatly to overall time consumed, four of these little beauties anchored to each corner could have the same effect as jamming a handful of extra horses under the hood.

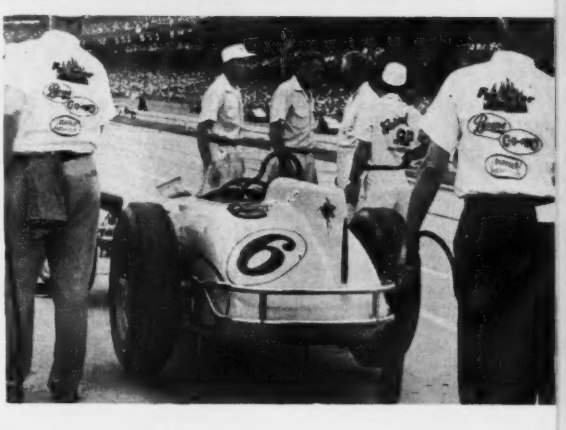
The case against European participation at Indy is not as hopeless as it would seem.

(Continued on page 90)

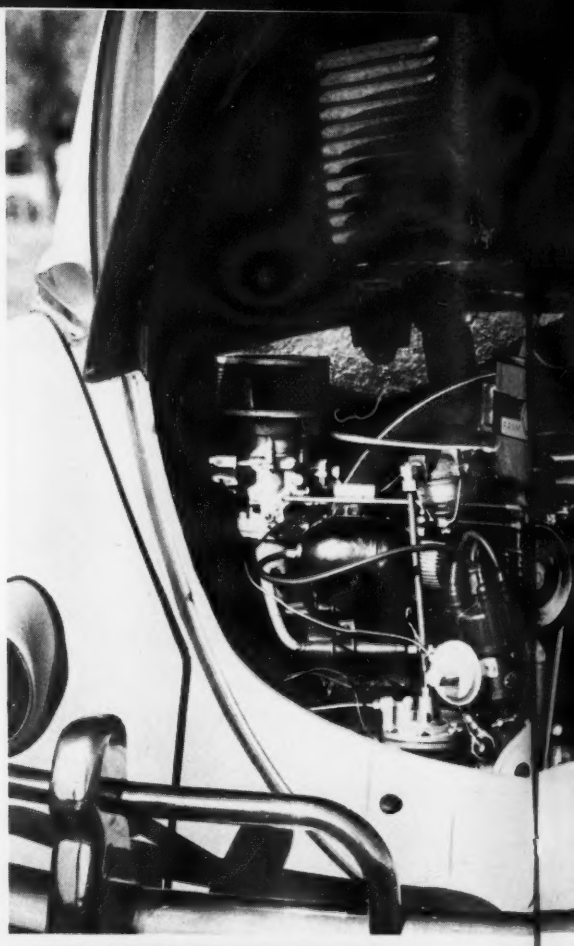


Top: Italian-built car's 136.395 mph qualification speed was too low. It was among the first to be eliminated. Above: Maserati V8 engine showed Indy promise although it lost compression between detachable heads and block. Below: Novi, long the most powerful Indy engine, had trouble with supercharger. Bottom: This year's race was won on a set of fast built-in air jacks

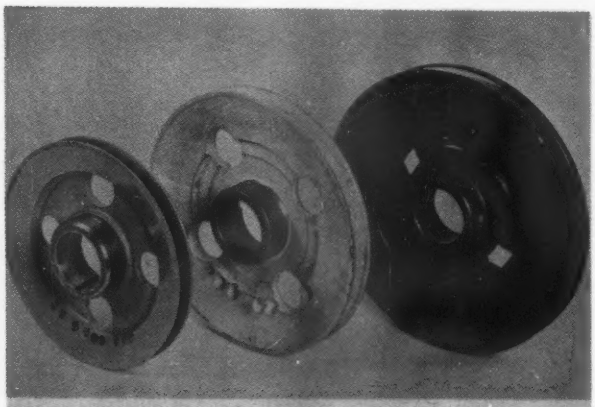


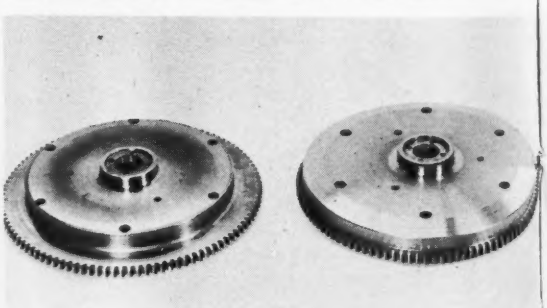


Right: Twin carbs and oil filter are surface indications of the work that was performed inside the engine of the Wolfsburg Wildcat. Above: In front of stock VW manifold is the special one supplied with the Okrasa kit, and the one Eichhorn, right, built up to use with the Okrasa head. Eichhorn used bigger tubing.

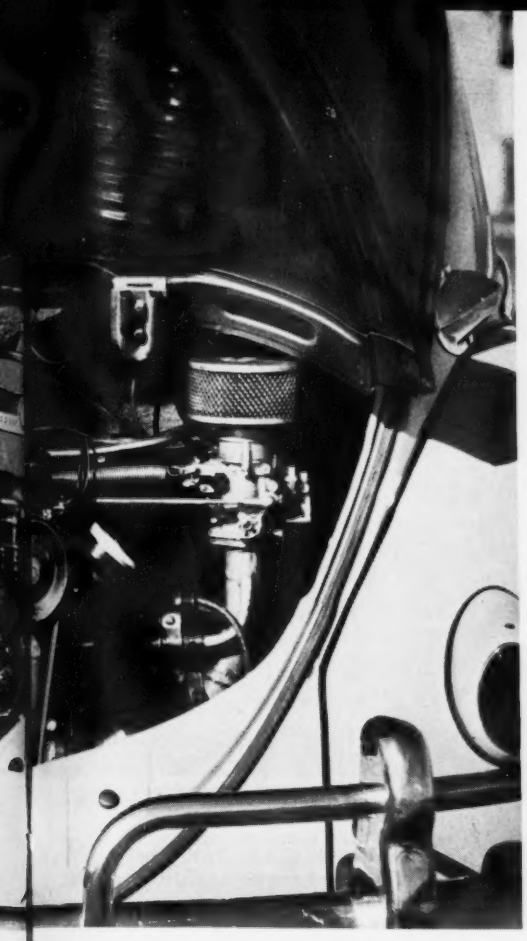


Right: Detail of motor boat air scoop. At high speed air, at high velocity, is discharged directly into air filter above carburetor. Above: Dials, Dials everywhere. Extra instrumentation includes: oil pressure gauge, oil temperature gauge, fuel gauge, Karmann Ghia 90 mph speedometer, and Sun tachometer. Old time VW hands have been known to cry when they first set eyes on the Cat.





Left: Three different pulleys were tried on the Eichhorn V
From left to right: Standard VW, early, large diameter Porsc
pulley, late model Porsche pulley. Smaller wheels keep cooli
fan turning at slower speed for more efficient cooling at hi
engine speeds. For high rpms balancing is essential. Abov
Flywheel at the right is stock VW item. One on the left
the chopped job—five pounds—that Eichhorn uses on his engin



James Eichhorn's modified VW with the spoils from 18 speed events, and four rallies.

by Hile Goodrich & Dick Burnell

WOLFSBURG WILDCAT

► The Volkswagen is a vexing machine with its split personality. Its handling characteristics are sporting, but in the power department it's been sold a little short, as any honest Volks owner must admit when he's "rowing" up a hill with the gearshift.

Doctors of Dig have been trying to turn the little bug into a fire breather by beefing up the power end. Much head scratching and even more head shaking has resulted.

Results of these attempts at upgrading the VW engine usually add up, as was told in Sports Cars Illustrated recently, to performance barely acceptable when compared to domestic products from Detroit. A glance at the Volk's stock displacement figures (1,192 cubic centimeters) indicates that there must be more power lurking in Dr. Porsche's *wunderkind*.

After all, the Lotus with 1,100 cc is a real contender in any man's race when it's well driven.

Volkswagen "Doctors" have produced and used a variety of straight-through exhaust systems, superchargers, high compression cylinder heads combined with dual carburetors, dual carbs alone, hot camshafts and some that are merely warm, high compression pistons, lately a stroked camshaft or two and combinations of all of these.

Most of these experimenters feel pretty good about the whole thing if the modified engine can push the Volks hard enough to stay close to an MG-A, not the most exciting performer in the sports-touring car world.

In desperation, some have turned to the costly process of sticking Porsche engines into the VW chassis. Not only is this expensive, but it also takes some doing to find an unattached Porsche mill around. A few others have gone into flights of fancy and thought about putting a Corvette engine in a VW, thus coming up with some sort of ultimate in a dragster dressed in innocent Wolfsburg metal.

Volkswagen owners and fans, being a proud and stubborn breed, were bound to continue trying, until someone came up with something hot and still basically Volkswagen—and damn the cost or official frowns from the VW factory people.

One of these experimenters is a young Denver mechanic, James Eichhorn, who late in 1955 bought himself a new VW. Like a lot of others, he immediately began to wonder how to give the bug more "go". He had a hot rod background, having turned a Ford Model "A" roadster into a fair piece of machinery.

He repainted the top and engine compartment lid of the beige VW a deep metallic brown to give it character and set to work.

By the late spring of 1958 he had a combination that came really close to giving him satisfaction. With the Eichhorn modified engine, the beige and brown bomber was then feeding exhaust to MG-As around Denver for its morning warming-up exercises.

His first competition with the new engine was at the Laramie, Wyoming, speed trials in May, 1958. The hopped-up VW won its class with ease and wound up third overall, causing a few raised eyebrows at the meet. Machinery losing to the Eichhorn wagon included, for example, the big-engined Studebaker Hawk.

With his race tuning ironed out, Eichhorn entered the SCCA-sponsored races at La Junta, Colorado, a few days later. Viewers there were treated to the spectacle of seeing a mere Volkswagen chase a pair of Porsche 550 Spyders around the course and take third in the "F" modified class. Running behind Eichhorn in that race were some Porsche "normals" (1,500 cc and 1,600 cc) Alfa Romeo Giuliettas and MG-As.

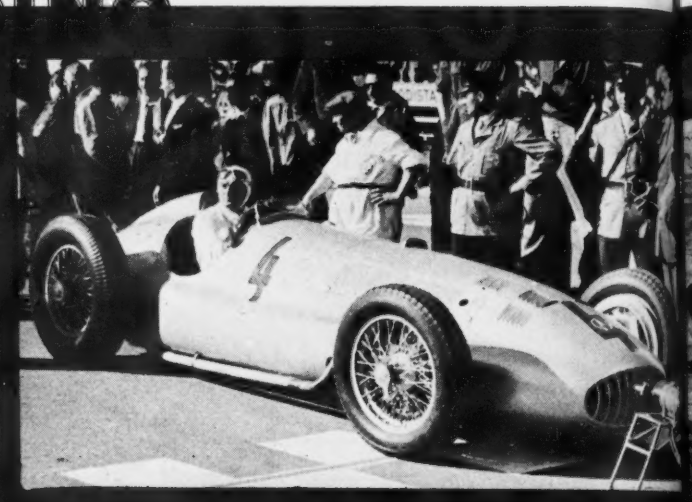
Next came a speed trial in Jefferson County, just west of Denver. By this time the beige and brown VW was known at least to contestants who had faced it before. The car was bumped up one notch in the particular set of classes being used that day. Still the Eichhorn car took its class. It also placed fourth overall. A Porsche 1,600 Super was the only sports car to top the hot Volks. The first three places that

(Continued on page 96)

ARGENTINA GRAND PRIX RACING

part 2 by Vicente Alvarez

Fangio did not have an easy win in 1952. Gonzalès was always waiting.



A car and a man from the past. Hermann Lang in the Type W163 Mercedes.

► In contrast with the bonanza atmosphere of the precedi.g year, the "Temporada" suffered a letdown in 1951, for which a satisfactory explanation was never given. As late as January 1951 not a single official word had been published about the races for which the fans were eagerly waiting. The Argentine public had tasted big-league Grand Prix racing and had liked it. Their idol, Fangio, had already become a top-notcher in Europe; they could hardly wait to see him defend his laurels at home. In February, rumors had it that there would be no International Season for the year—at any rate, the big contingent that had come over the year before would not appear again, according to the ever-present unofficial informers who claimed to have it fom good authority that European drivers had decided to boycott races in Argentina as the result of an incident during the 1950 Argentine "500".

No official communication ever dealt with this incident. Late in February, though, the news came: the "Temporada" was on, with different faces and cars—Mercedes Benz was sending three 1939 three-liter cars. The European invasion had shrunken for the time and the field was to be completed by the two-liter blown Ferraris, 1500 cc "San Remo" Maseratis and Simcas owned by the Automobile Club and driven by Fangio, Campos and Gonzalez in the previous season, and a few privately-owned Maseratis and Alfas of earlier vintage. The slate wasn't particularly fascinating: it was a bit of a letdown after the glamorous 1950 program. One episode however, supplied some of the missing excitement and a good deal of newsprint was devoted to it, mainly abroad, for obvious reasons . . . The Mercedes Benz team was reportedly formed by Giuseppe Farina (just-crowned European Champ) Hermann Lang and Karl Kling. Then suddenly Farina had to stay in Europe and Fangio took over his car. Remote-control dismissal of the Italian pilot wasn't at all uneventful, though.

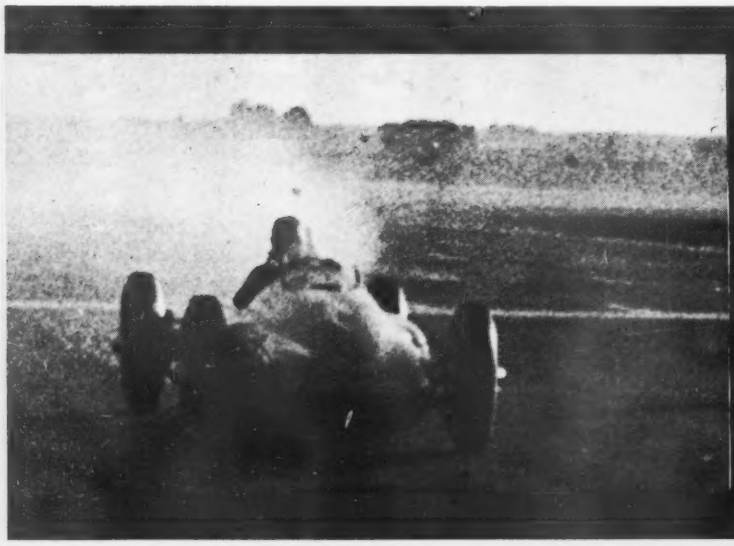
A detailed description of the lobbying preceding it would take many pages but a condensation of the most credible version is that Fangio, slated to drive one of the two-liter Ferraris did not want to take any chances against the fabulous three-liter "silver arrows" and demanded a berth on the Mercedes team. At that time, he not only had millions of ardent (to put it mildly) followers who would take no other winner than their hero, but influence as well. The government, that had used Fangio for political purposes (remember: it happened in those days . . .) stepped in and intimated to Mercedes that it would be wise to shove Farina off the car and give his place to Fangio.

Mercedes Benz would have had no part of such a suggestion in the good old days but times had, evidently, changed. The "or else . . ." implication was certainly instrumental: Farina stayed home.

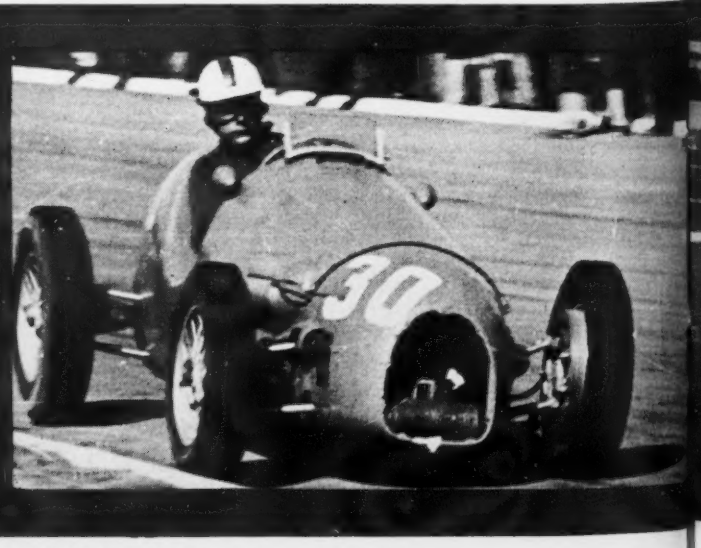
The "silver arrows" were beaten in both races by Jose Froilan Gonzalez at the wheel of one of the two-liter Ferraris . . .

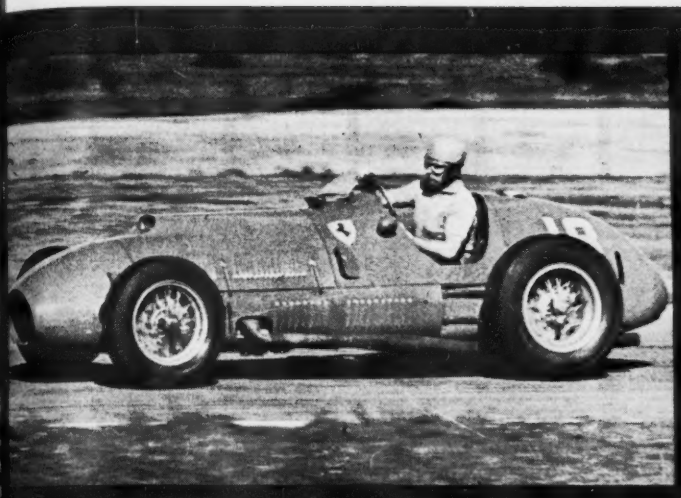
The Palermo course had been discarded

First and last time out for the Cisitalia. It had four-wheel drive.



Gordini-mounted Jean Behra placed 6th in '53 in one of his first GPs.





Ascari looks disgusted as his big 4.5 Ferrari starts to run rough in '53.

Fangio is out of the 1951 race with carburetion troubles. Here, he heads in.

–racing thereon conflicted with the city's views and a new site was chosen for 1951: a 3,500-meter course on the coastal avenue of Buenos Aires where no regular traffic was encountered. Included in the course were two long stretches (two-way traffic at top speed) and a somewhat winding section on one end. This new course incorporated a section of lovers' lane but did not conflict with anybody's views since racing activity was confined to the daylight hours only. Fangio proved again a natural in anything on wheels and after little practice set the fastest qualifying mark with the unfamiliar–and unconventional–Mercedes: 2:01.7 for the lap. Lang and Kling sat alongside him in the front row. The March 18 race was a 45-lap affair. Lang took the lead, followed by Gonzalez. Fangio lost 21 seconds on a wheel-change in the early laps. Gonzalez drove past Lang on the 23rd lap and stayed ahead to the 36th, when he pulled in for replenishments. Lang regained the lead but lost it soon after Gonzalez went back to the race. Final positions were: Gonzalez, Lang, Fangio, Galvez (on the other 2-liter Ferrari). Winning average: 61.207 mph.

This race was expected to be a pushover for Mercedes as they outpowered all opposition by far, but none of the old W163's sounded terribly healthy after the initial laps. Gonzalez' fierce charge pushed them beyond their safe range. *Oberingenieur* Neubauer was broken hearted and forgot his manners most conspicuously as the once glorious "arrows" gradually lost ground. The traditional clockwork precision of the Mercedes pits crumbled as the race progressed.

Carburetion troubles under the hot, humid, Buenos Aires climate were blamed for the poor show. Gear-ratios available did not seem to suit the course and changes of tire-sizes was only a partial solution. Work on the M-B's was frantic for a whole week, yet they did not fare any better in the second race.

Fangio won the pole again, with a lap in 1:58.40, at 66.215 mph. Kling and Lang were next, in that order. Three *Silberpfeile* in the first row brought back memories of better times. The race of the week before was forgotten and hopes of the M-B fans soared as the cars took off with an impressive burst of power, but their domination was to be even shorter this time. Leading at the start, Fangio dropped back on the second lap; Lang took over but Gonzalez passed him on the fifth, to stay in front to the finish. Fangio went out on the 16th lap. Local driver Menditeguy had beaten the Mercedes, too, at the half-way mark, with the old 3.8 Alfa, but ran out of gas far from his pit and quit. So far, he had driven a wonderful race and was slowly closing on Gonzalez–it was his first time on a Grand Prix machine and he was not aware of the presence of a reserve tank. Gonzalez won at 62.350 mph. Kling came in second, 2½ minutes later; Lang was third.

The only three cars entered with a fair amount of power available had proven faster than the M-B's. (Galvez quit with

Yes, people do build their own GP cars. This home-built had 2.3 blown Alfa.

Froilan Gonzales faced the full Mercedes-Benz team in '51, and beat them.

a broken axle-shaft in his 2-liter Ferrari when he had already passed them.) The rest of the field did not count, before or during the race, being merely a conglomeration of old, tired, underpowered iron; this spared the Mercedes a worse humiliation. Many sad faces could be seen long before the revenge-race was over. Confusion was not confined to the Mercedes quarters: it hit the President's box as well. A number of individuals moseyed to that particular area looking for a convenient place to conspicuously lick their wounds. But, in the end, everbody was happy, even Mercedes Benz—if not their *rennabteilung* at least the Export Division . . .

1952

Fangio had brought his first world crown home, with Gonzalez a runner-up of distinction. Argentine fans could hardly wait to see their idols in action. The newly-built Autodrome was due to open in Buenos Aires with the International Races. However, the quality of the field—as an average — was not up to the grandness of the occasion. What it amounted to was second-rate cars running on the premise of a truly first rate course. The top favorite machines were the veteran 2-liter blown Ferraris (Fangio and Gonzalez). From Europe came Italian Nello Pagani, motorbike champion, who made a cleanup on two wheels but looked anything but at home on four, driving a Formula One Maserati. Gordini sent two cars over, to be driven by Robert Manzon and Andre Simon.

The opening program was a bit circus-like: too many races—motorcycles, sports cars, semi-stocks—preliminary to the Grand Prix, but the abundance of curtain-raising events could not compensate for the low quality (technically, that is) of the main event. A crowd estimated at 400,000 was present for the first date, March the 9th. Course Number 4 (4,706 meters) had been chosen and Fangio had qualified for the pole in 2:25; Gonzalez was next, in 2:28.30; Manzon third, in a 1500 blown Gordini; Bucci fourth, in the antique 4.5 blown Alfa.

Manzon's car was rammed at the start and forced out; Fangio led all the way, with Gonzalez trailing closely. Brazilian Francisco Landi came in third on another 2-liter blown Ferrari. Fangio had at last, scored his first win in Buenos Aires, and repeated a week later—more easily this time as his top rival Gonzalez was forced out at the half-way mark with a broken crankshaft.

1953 FIRST ARGENTINE GRAND PRIX

After two indifferent seasons, the Automobile Club announced that—at long last—a World Championship sanction had been obtained from the FIA. The first Argentine Grand Prix was to open the international season in 1953. Course Number 2 (3,912 meters) had been definitely adopted as the stage for this event, to be run under the three-hour formula, and open to F-2 cars (two liters). Other World Championship races had been run previously with F-2 cars, on special agreement in Europe. This was a transition measure intended to help development of new engines and cars for the new Formula One (2.5 liters) planned for 1954. Four "works" teams were on hand, namely Ferrari, Maserati, Gordini and Cooper-Bristol. To the crowd, the center of attraction was, of course, Fangio, who had had a lean year in Europe as a "works" pilot for BRM in 1952. This was also has first appearance in competition after his serious accident in Italy.

The new status of the "Temporada", now a sporting affair of world prominence, was the reward for the efforts of a few determined men in the Automobile Club. A crowd in excess of 400,000 persons overflowed the grandstands and clustered alongside the course.

Color and excitement reached an unprecedented height and Race-Board chairman Francisco Borgonovo (justly liable of much criticism but in all fairness, too, referred to as the "father" of the "Temporada") could hardly check his emotion as he dropped the national flag, sending the world's best Grand Prix talent and machinery off to fight for the honors in the first Argentine *Grand Epreuve*.

A sizable crowd attended the practice runs — excitement mounted as race-day neared, but dropped on qualifying day (January 17) due to the heavy rain. Qualification marks were below practice times: Ascari drove his 2-liter, 4-cylinder Ferrari to the pole in 1:55.40 at 65.84 mph (he had done 1:50 in training); Fangio was second best, with a Maserati "six": 1:56.10; then Villoresi (Ferrari) 1:56.50 and Farina (Ferrari) 1:57.10.

Officials lost control of the crowd, and tried to remedy the situation while there was still time, but could not obtain the cooperation needed. Drivers refused to start unless the crowd was removed from the road. Police forces would not take orders from the race-authorities who, in turn, failed to persuade police-authorities to give those orders. The crowd was moved back in some places, but they ran back to the curbs as soon as the race got underway. Thirty spectators were killed as Farina spun off the road.

Ascari led from start to finish; Fangio got on his heels, with his teammate Gonzalez and Farina behind. Farina's accident happened on the 23rd lap; he had gotten by Gonzalez and was closing rapidly on Fangio. On the 36th lap, the transmission disintegrated in Fangio's Maserati, putting him out. Villoresi and Hawthorn passed Gonzalez as he pulled into the pit, but they had to stop. Gonzalez regained second place and held it until he had to make a fourth stop, with half an hour to go. He was at his pit when Villoresi drove by. Ascari won at 78.137 mph, having covered 97 laps in 3 hrs. 01:40.60, and set the lap record: 1:48.40. Villoresi came in second, Gonzalez third and Hawthorn fourth.

1953 GRAND PRIX OF BUENOS AIRES CITY

A week later the Grand Prix of Buenos Aires City was run on the more intricate Course Number 4 (4,706 meters to the lap). This was non-formula, non-championship 40-lap race and was won by Farina in his Ferrari (with a 4-cylinder, 2500 cc engine under the hood). His teammate Villoresi came in second with a similar machine. Gonzalez was third and Hawthorn fourth. Winning average was 72.456 mph. Ascari captured the pole at the wheel of the big 4.5 Ferrari but was beaten by Villoresi at the start and was forced out on the fourth lap with a broken rod. Farina set the lap-record for the day on his second lap: 2:22, and passed Villoresi on the eighth. Fangio went out of contention as he lost a full lap at his pit while the throttle linkage was fixed. Through the late stages of the race, Farina had barely one length on Villoresi and won by a split-second. Mike Hawthorn was third and Gonzalez fourth. Much credit must be given to local boy Bucci who surprised everyone by charging on the 8th lap to place the big old Alfa in fourth place, a position he held until a cracked block forced him out on the 35th lap.

DR. PORSCHE'S "CISITALIA"

The much expected feature of qualifying day was the introduction of Dr. Porsche's almost legendary rear-engine, 1500 cc blown, four-wheel-drive Cisitalia, eligible for the Formule Libre race. The car was painted blue and yellow, for Argentina, and had been "naturalized", so to speak, now bearing the "Autoar" factory badge. Amid the general suspense, the engine was started at the garage area and immediately clouds of thick pungent smoke scattered the crowd of kibitzers in all directions. Italian Felice Bonetto, in the cockpit, hurried to drive onto the track to avoid suffocation. One lap at a moderate clip was all the "Autoar" could do, leaving a dense cloud of smoke behind — Bonetto shut down the engine, and coasted to the pits. As he got out of the car he was shaking his head . . . Oil consumption had been two gallons for the 2½ miles. Never again was this car seen near a race-track. This unhappy presentation shattered many dreams: a success, or even a near-success, could have changed many things, with a lot of political possibilities, and economical conveniences derived . . . Remember: it happened in 1953 . . .

1953 SECOND ARGENTINE GRAND PRIX

Early in January, activity began on the Autodrome, preparatory to the Argentine Grand Prix, to be run under the new 2500 cc Formula. Expectation was great: Fangio had regained his crown in Europe and was defending it at home for the first time. He was Number One pilot in the Maserati *équipe*, driving the brand-new Type 250F six cylinder. Of his teammates, two were local drivers: Carlos Menditeguy and Onofre Marimon, and the third was an Italian rookie in F-1 racing, Luigi Musso.

Race-authorities decided to have the races run counter-clockwise this time, in the hope of solving a few problems that appeared in previous races. The new direction helped in a way, but not without bringing about some entirely new problems. The conclusion was inevitable that there was a great deal basically wrong

(Continued on page 86)

Unlike domestic wagons which are becoming lower and lower, the Peugeot retains a functional proportion in which a huge volume of cargo may be stored. Even with this utilitarian virtue, the car is pleasing in shape and not excessively boxy. Only disadvantage is the side-hinged door.

DRIVER'S REPORT

PEUGEOT 403 STATION WAGON

► "Station wagon living" is a Madison Avenue phrase that, in the inimitable manner of the gray flannel suiter, tries to confect a way of life around an inanimate object. The French, being the most logical of all the races, however, are not as susceptible to sloganizing as we in the United States. This is brought forcibly home when a major French factory undertakes the execution of a wagon using the American meaning (a vehicle that can perform all the functions of a sedan but with increased load carrying capacity) of the word as their design parameter.

The Peugeot 403 Station Wagon then, is just such an automobile. From the trailing edge of the front door to the 403 badge on the grille it is all sedan. The remainder of this Gallic dual purpose car is all utility vehicle — with the emphasis on the word utility.

Powered by a 65 bhp four that incorporates such interesting design items as wet liners, hemispherical combustion chambers, and inclined valves actuated by short and long push rods, the 403 wagon is more than a match for other imported 1½-liter sedans. Proper use of this willing power plant can not be made until the new Peugeot driver becomes familiar with the three-speed plus overdrive fourth of the 403 gearbox. Cogs in this smooth-working

box are stirred by a short — it could be a fraction of an inch longer, for people with short arms have to sort of sneak around the steering wheel — column-mounted lever. All four forward speeds are synchronized, and the linkage has not been rubber insulated to the extent that shifting motions take eons of time to reach the gearbox proper. The shift pattern is unusual. Three speeds are placed in the normal relationship with reverse above first in the same plane. Fourth, (which is termed an overdrive by the makers) is sequested behind second gear — a position obtained by pushing all the way down through neutral and then up. This all sounds more difficult than it really is in practice. After using this shift pattern for a few hundred miles or so the logic of it (remember the French are a logical race) begins to seep in.

Around town you have an American-type three speeder with adequate snap in third to take advantage of the holes in traffic that the car's compact size makes usable. Once on the highway fourth overdrive (which the Peugeot people say should not be used below 40 mph) comes into play. In this top gear the 403 station wagon hums right along with the major portion of the noise level being caused by the Michelin X tires.

A comfortable cruising speed with some 600 pounds of people and baggage aboard is in the upper 60s with 70 mph all too readily available. It is possible to accelerate in top gear, but very slowly. For this reason all passing maneuvers are best made in third. The shift from fourth to third is easy—making it no problem to snick this ratio quickly before passing. Catching second, which is between reverse and fourth takes a little more practice but the direct-acting linkage makes it equally simple once the gate is fully understood.

Any adventuresome passes at first while on the move are best left for speeds below 15 mph, even though this ratio is fully synchronized.

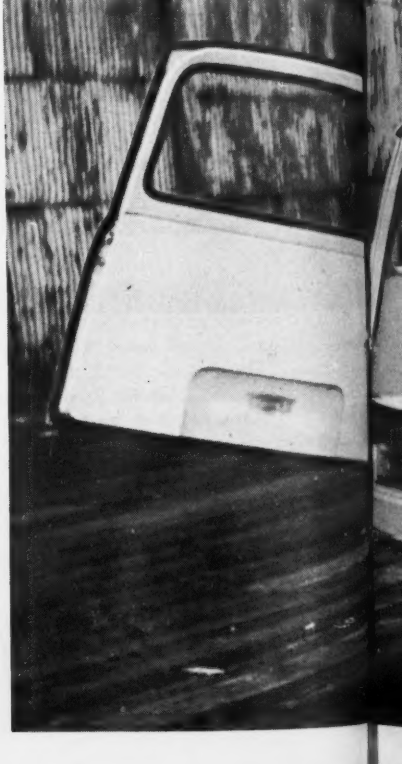
The combination of a peppy engine, all-synchro gearbox, and precise steering would be a waste of the good things in life if they were allied to an ultra soft suspension system. We're happy to report that the 403 wagon is not flabby in this department. The wagon departs from the Peugeot sedan in respect to the rear suspension in having leaf springs instead of coils. These leaf springs are further beefed up (this is one wagon that *can* carry heavy loads over rough roads) by helper springs. How then does the package containing all these good things handle? We would say good trending toward great. How much of this stickability is due to the Michelin Xs and the aforementioned suspension system is hard to say. We do know that lightly loaded the 403 wagon can be tigered around narrow, twisty back roads with a great deal of satisfaction accruing to the Walter Mittyish type behind the wheel. Loaded down with Mom, Pop the kids and all the tons of impedimenta that this sort of combination collects the Peugeot is comfortable while still retaining a useful performance.

Going still deeper into the subject of interior room it might be of interest to compare the 403's measurements with those of a domestic wagon. We used a '57 Ford only because it was handy to our tape measure.

Door Opening:	
'57 Ford Wagon	Peugeot 403 Wagon
3 ft, 9 ins. wide	3 ft wide
2 ft, 4½ ins. high	2 ft, 6 ins. high
Rear Deck (with back seat erected):	
4 ft, 2 ins. long (plus tailgate, 5 ft, 11 ins.)	3 ft, 10 ins. long
4 ft, 10 ins. wide (minus wheel wells)	4 ft, 6 ins. wide (minus wheel wells)
Rear Deck (with back seat down):	
7 ft, 5 ins. (plus tail gate, 9 ft, 1 in.)	5 ft, 10 ins.
Interior Height:	
2 ft, 11 ins.	3 ft

The above chart illustrates better than mere words or pictures how little this compact wagon gives away in usable inside room to a longer wheelbase example of the species. One place where the Peugot falls down is in the use of a side opening rear door. A tail gate arrangement (with husky hardware!) would add three or four more usable feet of rear deck. About nine inches in height might be stolen from a repositioning of the spare tire, which is nested in its own compartment under the decking. This is not such an illogical spot as is, however. Most U.S.-built wagons force removal of a good portion of the cargo to get at the spare.

One error that the Peugeot — along with nine out of ten of the other builders of station wagons—have fallen into is the use of a slippery surface for the cargo deck. Small, unanchored objects react to sharp braking like little missiles ending up with



a clatter against the back seat. Sure cure for this at small expense is a length of grooved rubber runner as used in office building lobbies during rainy weather. A last thought on carrying capacity — if 80 odd cubic feet are not enough there are six built-in sockets in the roof into which a non-finish damaging rack can be slipped. A French family then can take to the highway with possibly as much — if not more — gear than the average American family ensconced in one of the products of the big three.

That a trip to the Riviera can be made at less money for gasoline than one to any domestic watering place goes without saying. If Pop tries to imitate Fangio for most of the trip in the 403 mileage might fall to 23 mpg. If he uses his right foot with restraint on the incredibly soft pendent gas pedal 27 mpg is not out of the question. Either way, fast "get there" driving or slow touring, he is assured of above average stopping power. The brakes are powerful and bring the wagon to a straight line halt even when loaded to the gunwales, something that can be said of few other half truck and half sedan vehicles. In most cases designers concentrate on penciling in additional cargo space with scant attention being paid to a set of huskier brakes that will stop the fully loaded end result.

Steering, which was alluded to above with the one word "precise", needs a few more words for an accurate description. Initial pressure at the wheel rim brings to mind thoughts of heavy in the hand but once the first resistance is overcome it is light, without a trace of lost motion. With 3¾ turns lock to lock it is low geared and dead accurate, without a bit of kick back or wheel fight.

Needless to say this sterling aid to navigation is of the rack and pinion variety. Good road holding and good steering more than once bemused us to the point where we forgot that we were driving a station wagon, which is a type of vehicle that is—according to our better half—traditionally driven in a conservative manner.

On long runs the separate seat behind the 403's steering wheel can be completely comfortable or slightly tiring depending on whether or not the driver is tall or average in stature—or like Bert Piel average in stature — meaning short. Our giant-sized friends — we have to own up — we're short — found the driving position just great with the pendent pedals coming naturally to foot and the steering wheel far enough away to enable a fairly straight-arm position to be adopted. When we hopped aboard, thinking that we wouldn't fit worth a damn, everything fell into relatively the same position as — once the seat was pulled forward — for the long-legged person. It felt comfortable, and it was comfortable with arms outstretched, yet with feet well within reach of the pedals. This, we thought, was the car for banty-legged people. After an hour's drive a small fly nose-dived into the ointment. The seat angle allowed the front edge of the cushion to nag at our thighs, while the hanging pedals, which demand more of a push down than straight in and out movement, aggravated the condition. Later examination of the seat showed, however, that the angle could be changed with a minimum amount of work. Moreover, where else can average-sized people find a car that they can straight arm ala Nuvolari, and still reach the go button. Still another point on fitting the car to the driver. People of ample girth generally do not slide around in cars—those of slighter build have a little more trouble staying anchored. The Peugeot 403 wagon eliminates this problem with a rough-textured plastic upholstery material that combines a high coefficient of friction with complete washablity.

A few other points on the interior arrangements. The steering wheel column is angled, which might annoy some people. In reality, once noted you forget all about it. On the left side under the dash board are four easy to get at fuses secured by large plastic knobs. The lights are controlled by a wand mounted on the left of the steering wheel column, while the turn indicator arrows on the instrument panel are set to winking by a lever on the right side of the column. Instrumentation includes water temperature, fuel gauge, ammeter, and clock. Situated above these small square dials (what ever happened to round dials?) is a speedometer that includes a total mileage recorder and a trip recorder. Window washers—a blessing when off the super highways—spray a commendable area when the panel-mounted button is pressed and are included as standard equipment. Michelin X tires and factory balanced wheels, outside rear-view mirror, chrome tail pipe extension, and extra fuses and light bulbs are all included as standard equipment.

This then is an all too brief word picture of the Peugeot 403. It is an anomaly in that it is a no nonsense vehicle that still retains an engaging Continental personality.

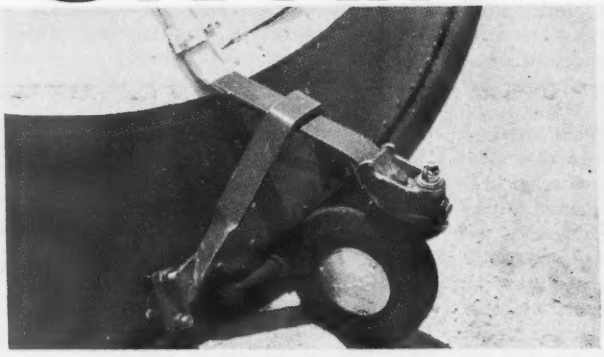
—ww

Curtiss-Wright's new project is either a high-flying car — or a low-flying airplane.

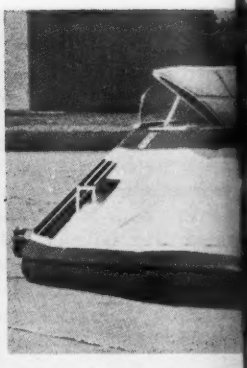
by Karl E. Ludvigsen

RIDING ON AIR

Prototype air car uses four-cylinder air-cooled Continental engine. It puts out 85 horsepower.



Curved rubber skirt runs around bottom edge of body. Steel wire controls amount of curvature.



► When Curtiss-Wright called a press conference to demonstrate its sensational Air-Car to curious newsmen, it was amusing and illuminating to note the types of publications represented. In addition to general-interest weeklies and monthlies there were reporters from automotive as well as aeronautical magazines. Most surprisingly no seagoing journalists were on hand, for the Air-Car is as much at home over water as it is on land or hovering a few inches in the air. No one quite knows what to call the Air-Car, but a listing of its incredible capabilities makes reading that sounds like science-fiction. The air-car, as we found out, is not a fictional vehicle, however.

Its creators refer to it as a *ground-effect vehicle,* in a sense to differentiate it from helicopter-type machines which support themselves without any assist from the surface. All ground-effect vehicles are held up literally by compressed air, just as air under pressure can support a pneumatic cylinder or an automobile through the intermediary of an air spring or a simple tire. If you can imagine a deeply punctured tire whose escaping air is constantly replenished by an external supply which keeps it from going flat, you have a good idea of what keeps a ground-effect vehicle off the ground.

One approach is illustrated by Ford's Glideair of 1958, a scale-sized mockup which, like the Ford demonstration scooter, is supported by high-pressure, high-velocity air emerging from multiple circular "levapads". Since the total supporting area is small the pressure must be high, and since the air escapes from the pads easily the volume required and thus the velocity must also be high. Ford measures distances from the ground in fractions of an inch, an aspect of performance that limits the Glideair to smooth ground surfaces — no water.

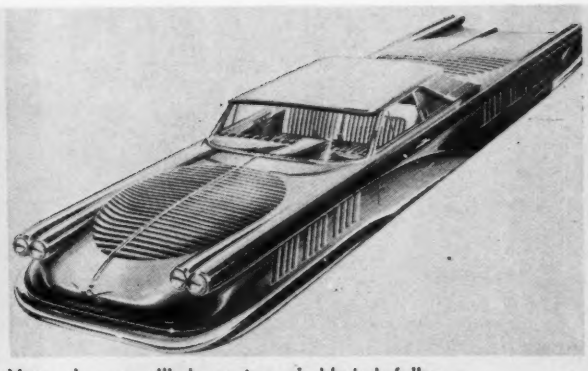
Curtiss-Wright's experimenters took a far simpler view of the ground-effect principle. By utilizing the largest possible (or practical) ground area and by restricting the air's escape path to a degree, they've been able to get an all-surface capability with low air speeds and pressures. Very briefly, for now, the Air-Car is analogous to a big inverted cup fed with air by an engine and propeller, which together serve to build up pressure within the cup and to replace the air that escapes between the rim and the ground.

Within the shell of the Air-Car a pressure of about one-tenth of a pound per square inch is developed. This pressure exerts a lifting effect over the projected ground area of the vehicle, which in the case of the prototype Air-Car, 12-feet wide and 16-feet between its rounded ends, is about 161-square feet. An approximation of its lifting capacity would thus be 2310 pounds. The first Air-Car weighs 1050 pounds empty, which leaves a net payload of 1260 pounds. Curtiss-Wright engineers have already hung 700 pounds from the Air-Car's tubular structure and feel that they'll be likely to break up its frame before they reach its load limit. After a point, of couse, the load carried becomes an academic consideration, since with very high burdens mobility will be lost. C-W releases state that vehicles of the Air-Car pattern will weigh "Approximately 425 pounds per passenger or payload equivalent", staying well on the safe side.

Air pumped in through the top to supply lifting pressure constantly escapes around the periphery of the Air-Car. To retard its exit and to give (unintentionally) the effect of an annular jet, the edge was hung with a six-inch curved rubber skirt whose curvature could be regulated by pulling in or releasing the steel cable bonded into its bottom edge. As more air is forced through the machine the distance between this bottom edge and the ground *must* increase, with constant load, just to let the air out! The "altitude" that can be reached, then, depends on the *excess* power that can be called in over and above that needed to build up enough pressure to get the load clear of the ground. It should be mentioned that the *precise* pressure within the shell of the Air-Car will depend on the load being carried, assuming constant engine and fan speed.

Since it's *upward* push that lifts the Air-Car, and not any kind of "downward push" against the ground, and since these effects are distributed over a broad area, this remarkable vehicle can travel over *any* reasonably smooth surface from concrete and grass through marshes to open water. When operating on water the surface naturally tends to be blown away in a manner that calls for at least some extra horsepower — expressed in terms of extra inches of clearance on land — plus a tolerance of clouds of spray that put a Chris-Craft to shame. Curtiss-Wright is developing pontoons for future Air-Cars which will at least deflect this spray down-

Joy stick controls slats that direct air streams out side of body to turn air car.



New air car will have two six-bladed fully-ducted fans giving an 11-in. ground clearance.

ward, like a speedboat's chines, and which will allow the Air-Car to be "landed" safely on water.

In addition to the water capability, the volume of air supplied over and above that strictly required to lift the empty vehicle affects several aspects of the Air-Car's performance. To elaborate on the load-carrying situation, let's imagine an Air-Car hovering at constant throttle with only the pilot aboard. If a passenger now vaults aboard (preferably in the middle, like a dinghy, since weight carried must be roughly balanced) more internal pressure will be needed to support his weight. The vehicle "sinks", decreasing the gap around the edge and thus by reducing the air exit area automatically increases the internal pressure! A neat self-regulating relationship exists. If it's desired to maintain the original altitude the throttle must be opened to pump through more air.

As used so neatly in the Air-Car, extra air volume is also responsible for all aspects of propulsion and control. The pressure air that exists within the Air-Car's hull is allowed to escape through segments of the sides, controlled completely in its direction and volume. There are four sets of vertical-venetian-blind louvers, the two front sets being aimed toward the rear and those in the back exhausting forward. If the pilot wants to move forward he opens the two front vane sets, releasing pressure air to the rear and creating an imbalance of forces that propels the Air-Car forward. To brake or go backward he closes the front vanes and opens those in the rear, with symmetrical results. Moreover if he'd like to sidle to the left he can open the front and rear vents on the right side, and if, say, the left front and right rear are opened this versatile vehicle will piroutte clockwise like a ballerina!

The twin functions of drive and control are thus inseparable in the Air-Car, there being no definite "front" or "back" unless such is designed in for some practical or aesthetic reason. In the prototype machine C-W engineers installed individual joy-sticks for each of the four sets of vanes, solely to explore all possible combinations and permutations of control. Later editions will be guided by an aircraft-type wheel, turned for turning and pushed forward and back for motion in the appropriate directions. Special types of controls may be developed for unusual situations.

It will be evident that any air exhausted to propel and control the Air-Car can no longer serve to support it, so there's a very finely-drawn relationship between the load that can be carried and the speed that can be attained, again assuming constant air input. One must always be sacrificed to obtain a maximum of the other. With only the pilot aboard the original Air-Car had enough excess air to go 24 mph. The bigger twin-engine machine now under construction will have a static ground clearance of 11 inches, as against one inch for the prototype, and at a speed of 50 mph will lose an estimated inch-and-a-half to two-inches of clearance. There is not so much speed remaining as the number of inches of additional clearance would indicate, however. It would take nearly half of this projected Air-Car's total power to reach those final top two or three inches of clearance.

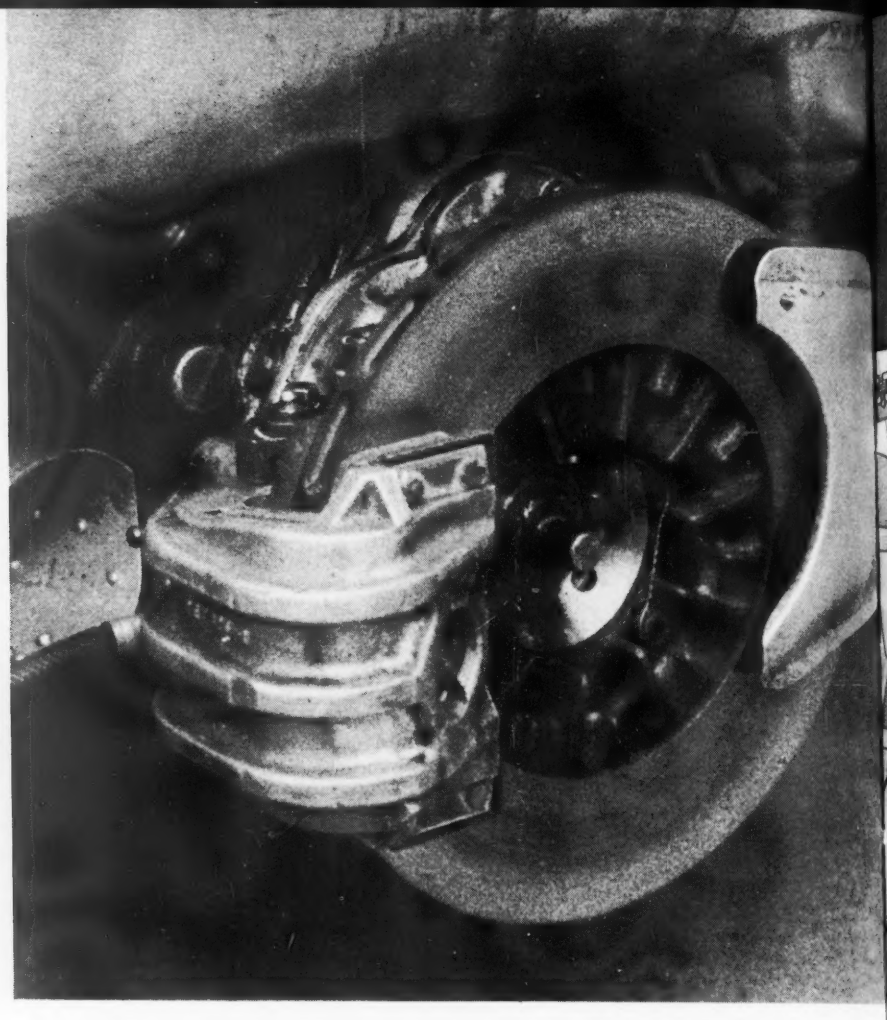
Just as in an automobile the hill-climbing condition of the Air-Car is an extension of its accelerative ability on level ground. It will naturally tilt up with the grade, since its skirts always tend to remain parallel or at least tangential to the ground, and excess air will be needed to "blow" it up hills. Curtiss-Wright foresees easy ascent of grades up to six percent by early Air-Cars. The failure of some other ground-effect vehicles to surmount even shallow grades can be attribued to inadequate power and/or underdeveloped propulsion systems.

The concept of the Air-Car had been tempting to C-W experimental engineers for some time before October, 1958, when construction of a prototype was begun in order to find out whether or not the principle could really be translated to practice. Its sweeping skirt was sheathed in light alloy and wood over a framework welded up of 1⅛ inch mild steel tubing, while the funnel feeding the five-foot air duct is supported by one-inch tubing. Suspended within the duct is a Continental C-85-12F air-cooled opposed-four which displaces 188 cu. in. and develops 85 bhp at 2575 rpm after being activated by its Delco-Remy self-starter. For the original tests in the wintry early days of 1959 and for the press demonstration this directly drove a McCauley take-off-pitch prop which kept the engine from revving any higher than 2100 rpm, well down its power curve. It was in this trim that a clearance of about one inch was maintained. (The rubber

(Continued on page 102)

racing brakes

Conclusion
by Karl Ludvigsen



Adequate cooling was one of the problems of the single rear disc brake on the BRM. Partial solution was use of greater mass of metal on this example as fitted to one car at Caen for the 1957 Grand Prix.

► Undeterred by the teething troubles down at BRM's Bourne workshop, Tony Vandervell saw a good thing in the disc brake and vowed to fit them to his own modified-Ferrari Thinwall Special. British brake makers were too involved with their own gestational testing to spare him any hardware, so Tony turned to the American Goodyear patents which had already sired the Halibrand and Crosley systems — each a success in its own limited sphere.

The ruthless efficiency with which the resulting Vanwall brakes functioned is too luminously etched in our memories to need recapitulation here, and is of special interest to this study because the Vanwall, Halibrand (and racing Lockheed) calipers operate quite differently from the opposed-piston Dunlops and Girlings I've already discussed. In place of a rigidly-mounted caliper with opposing pairs of pistons and pads, the Goodyear-based calipers have pad-applying cylinders on one side only, usually, on wheel-carried discs, on the side away from the wheel.

Since one pad will thus be fixed immovably to the "anvil" of the caliper, either the caliper or the disc must be free to shift laterally during application and as a result of pad wear. First up for analysis, the Goodyear-type brakes choose limited lateral motion for the caliper.

When they were first fitted to the "Thinwall" in the winter of 1952, Mr. Vandervell's light alloy calipers were seen to be exceedingly simple in layout. Round friction biscuits were pressed together by a piston in close proximity to the inner pad, the cylinder actually being bored in the caliper and covered by a plate through which brake fluid entered. Mechanically the 1958 Vanwall caliper was little altered, in spite of a constructional change from all-over machining to a cast caliper strengthened and cooled by three deep ribs.

This compact caliper was guided by two I-section arms, pivoted at both ends by wide bushings and of the greatest practical length, to minimize changes in the effective operating radius of the pads as wear progressed. To achieve this length, and to give the arms maximum "leverage", the caliper pivots were placed radially outboard of the pad and cylinder centerline.

In view of the fact that the operating piston of this brake is so close to the inner friction pad, its fine performance under the high heat loadings of racing is the more remarkable. Part of the answer must lie in the generous dimensions of the pads and in the high conductivity and heat capacity of the all-alloy caliper while another part has to do with the disc itself, which we'll take up later.

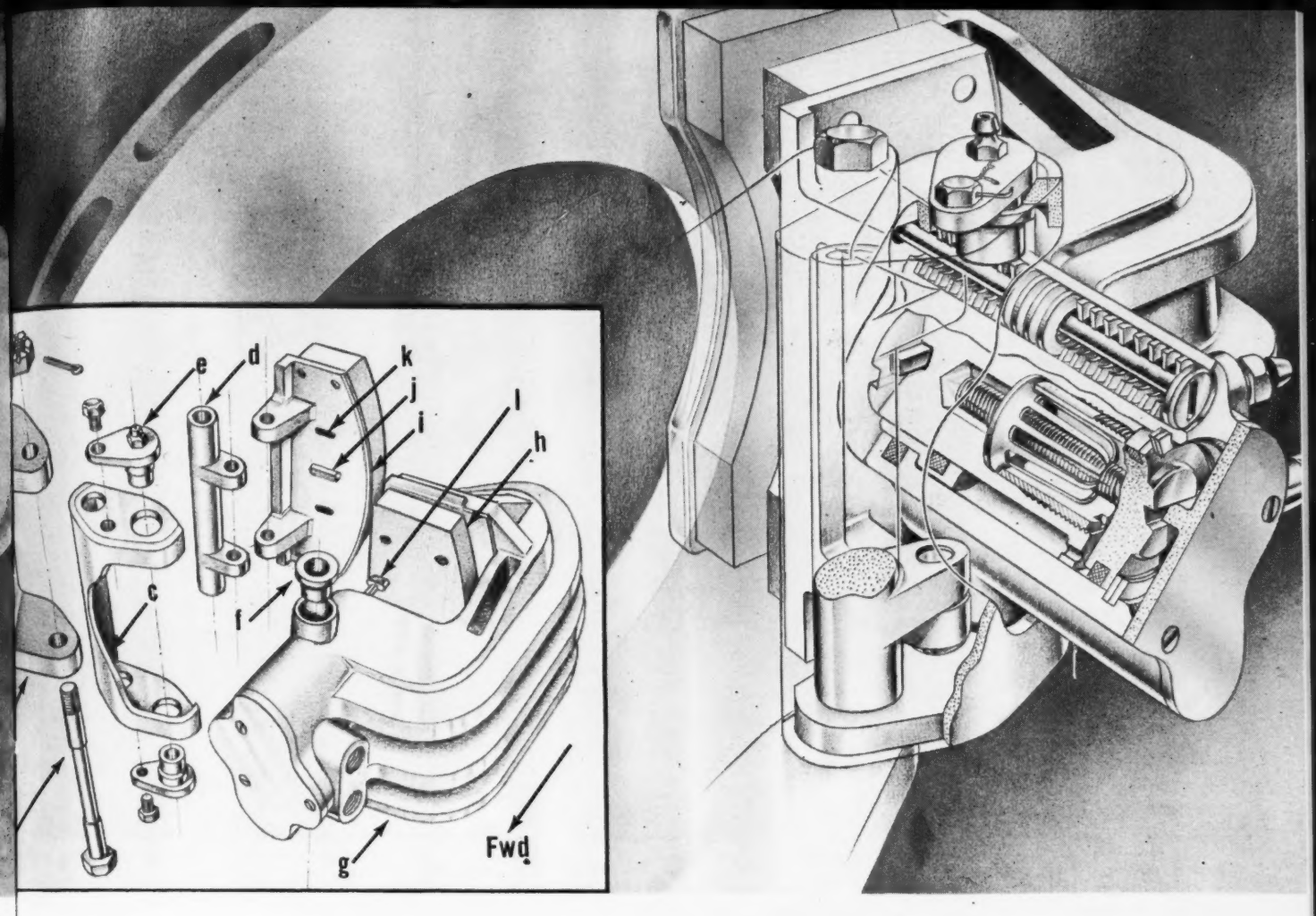
With a very similar pad/piston relationship, aggravated if anything by the use of a cast iron caliper-cum-cylinder, Halibrand disc brakes have proven best suited to intermittent-use applications as in track racing cars, where they serve more to position than to brake the car, and in drag machinery. They've been useful in sports car racing (the toughest job for brakes) only when as many as three of the large circular pad units are combined in special front-wheel calipers.

Ted Halibrand's movable brakes antedate those of the Vanwall, but resemble the latter in their compact, simple construction. An added touch for piston guidance is a rod — increasing in diameter year by year — protruding through the center of the cylinder cover plate. Most Halibrand single-spot calipers are guided by very short fabricated parallel arms, though the double-spot units are now most often carried by sleeves around two rods fixed parallel to the axis of the spindle so that the adapting motion is that of sliding instead of pivoting.

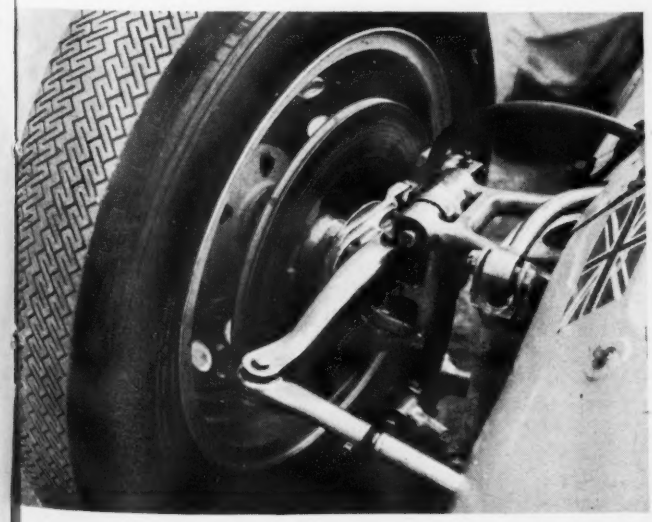
Vandervell mounted his front calipers at the disc trailing edges, but many Halibrand installations at the leading edge can be cited. There's such variety in the Indy and U.S. sports car applications, though, that this may be only by chance; about the only place Halibrand spots *haven't* been mounted is on the bottom edge of the disc. Maybe I just missed that one.

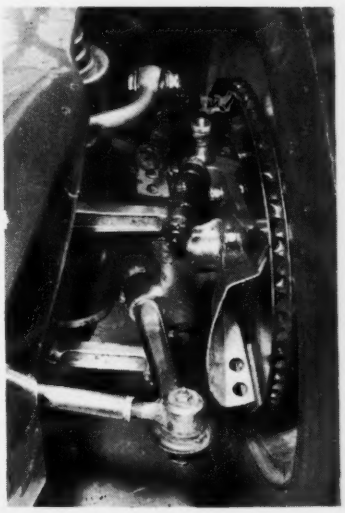
If the advance reports are accurate, it seems that BRM's will be halted by Dunlop discs in 1959 in place of the much-discussed Lockheed equipment that they've used since 1956. This is a sad turn of events for disc brake research, since the Lockheed calipers are of unique and interesting design, and were by far the most reliable element of the BRM's braking system.

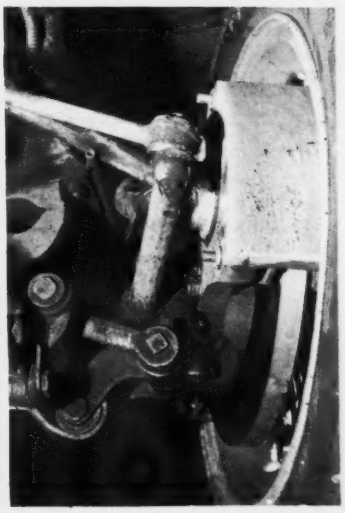
Problems with the servo, mentioned in Part I, and with the unusual rear brake

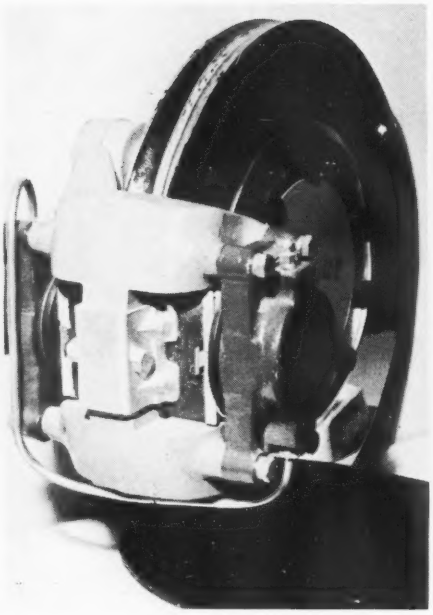


Above, the BRM's complex Lockheed movable caliper disc brake, now obsolete, hangs from flanges **a** of the gearbox/final drive casing. Mounted on pivot rod **b** are fabricated bracket **c** and pivot arm **d**. Located by flanged plugs **e** and bushings **f** is the caliper **g**, to which is fixed the rear (or outer) brake pad **h**. The forward (or inner) pad is attached to the steel plate **i** whose flanges are hinged to the arms on shaft **d**. Brakes are pushed on at lug **j** by the hydraulic pistons and pulled off by the T-heads on spring-loaded shafts **l**. The latter are inserted through slots **k** and turned through 90° during assembly. Right: Indy car disc installation has calipers separately mounted so that one can be controlled by a hand lever. Below left: Dunlop two-pad discs were fitted to Moss's Maserati for the 1955 season. They were placed well out in the cooling air stream. Below center: Best racing discs to date are Goodyear-based installation on '58 Vanwall. They didn't really need the scoop shown here. Below right: Messier (French) discs were fitted to Jean Lucas's early Ferrari Monza. Later Messiers had a much thinner disc.

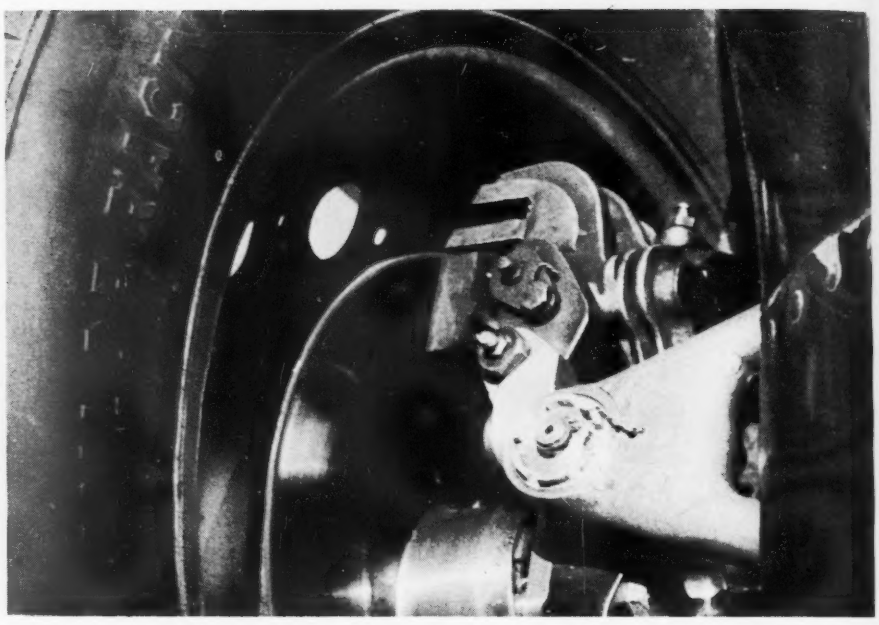








Dunlop discs are now adopted for all sorts of applications. This massive assembly is intended for heavy trucks.



Lockheed's design for the calipers on their disc installation on the BRM called for trailing edge mounting on disc.

mounting caused most of the highly-publicized grief. Both BRM and Vanwall, by the way, carried simple parallel Lockheed master cylinders utilizing conventional passenger car internal parts.

In the early days of the disc, Lockheed busied themselves with the movable-caliper concept, and though they have since switched to opposed-piston design for passenger car brakes, they opted for movable calipers for the very special BRM installation on the reasonable grounds that a "floating" caliper might better be able to follow any severe out-of-plane movements of the disc, such as might occur during cornering at ten-tenths.

You might not feel like braking at such a moment, but if you did at least the calipers wouldn't mind. Lockheed carried the two-pivot-link location idea a step further than most, moreover. Riveted to a plate which was in turn bolted to the anvil of the caliper, at the "outside" of the disc, the semi-curved ⅝-inch thick friction pad at the piston side was similarly wed to a steel plate with a deep stiffening rib along its hubward edge.

This inner plate was itself guided rigidly by a close-jointed double hinge concealed within the husky fabricated double-pivot arm that assumed responsibility for the bulk of the caliper. A rod, complete with Alemite fitting, served as hub pivot for both arms, the distance between pivots for the plate arm being just half that for the caliper arm.

In this way the pad-applying piston was completely divorced from braking torques and potentially binding side stresses. In effect, also, each friction pad has its own locating hinge, a feature which may ease the knotty task of providing effective retraction and automatic adjustment in a movable-caliper brake.

Cast of light alloy, the front calipers are stiffened by four ribs — one more than at the rear. In front the integral cylinders are also surrounded by finer fins for cooling. Each cylinder (a basic 1½-inches in diameter in the rear caliper) is actually sealed at the outer end by a rubber-ringed disc retained by circlips, the visible outer plate serving only as a dust cover and as a lock to keep the sealing disc from rotating. Why? From the disc a ⅜-inch rod reaches about 1½-inches into the center of the piston.

Threads over the length of this rod are engaged by a circle of eight hooked fingers which reach up from a ring carried by the piston. The angle and design of these fine threads and fingers gives a ratcheting effect so that the piston can progress forward but never retreat, supplying automatic adjustment. Naturally if the disc and threaded rod were to rotate, this adjustment would be thrown off.

Two big compression springs alongside the cylinder "push" the inner pad away from the disc, through long rods in tension. Free play in the mounting of the finger-carrying ring allows the pads to clear the brake disc by about .020 of an inch — a quantity that is quickly adjustable, by the way. Since this retraction is actually applied at the inner pad only, it's pertinent to ask whether any force tends to retract the outer pad in the same way.

Since the spring pressure acts between the inner pad and the caliper (which is physically the same as the outer pad) and since both are similarly hung on double pivots, the retraction force will indeed tend to "scissor" them apart. The greater mass of the caliper would appear to be balanced by smaller leverage working against higher-friction pivots in the mounting of the inner pad.

In researching the details of the BRM brake I've been fortunate in having the aid of Mr. S. M. Parker, an Administrative Director of Automotive Products Co. Ltd., producer of Lockheed brake systems. Mr. Parker also had the following practical comments on the BRM's controversial rear brake layout: "The decision to use a single rear brake was not of our choice but was imposed upon us on the grounds of saving unsprung weight.

"The added complexity of providing a drive for it on the gearbox; the complicated ducting for cooling and the difficulty of providing adequate ground clearance and of protecting the brake from oil which tends to blow back along the centerline of the car — together in our opinion make this design far less attractive than it would appear at first sight.

"If the saving of unsprung weight is of real significance, and this we doubt in view of the practice of others, we think it would be better achieved by two inboard brakes on the wheel shafts rather than a single brake on the transmission line."

In the BRM camp, at least, this single-brake idea dated back to an ERA-powered

drag and hillclimb machine built from V16 BRM parts for Raymond Mays. Unfortunately other fundamental deficiencies in the design kept them from learning anything about the behavior of the big single drum brake at the back. On the 2½-liter cars the disc is turned by the back of the gearbox mainshaft, which will always rotate faster than the wheels at the ratio of the final drive gears.

A pair of spur gears steps this down considerably, but the rubbing velocity of this central disc was still aggravatingly higher than is found at the wheels. In the course of development several piston assemblies for the rear caliper were tried in an effort to find the right front/rear proportioning of braking effort. The first ratio tried was the most front-biased: 72½/27½. Later 70/30 and 66/34 were tried, and finally 63/37.

This progression would indicate that the anticipated decelerations weren't achieved (unlikely), or that the BRM had a greater rearward weight bias during more of the race than was expected (more likely). As Mr. Parker put it, "The development of the BRM brake . . . has certainly been an interesting technical exercise".

If you're determined to supply pistons to one side of the caliper only, you have the alternative of a movable disc rather than a movable caliper. In the planning stage Dunlop considered this approach but rejected it because some sort of splines and periodic lubrication would be needed, and would have to function freely at very high temperatures.

Presumably they bypassed the movable caliper on similar grounds. In France the aircraft-oriented Messier concern went ahead with a movable-disc brake which was extensively used on Gordini's six and eight cylinder sports and Grand Prix cars from 1954 until "The Sorcerer" withdrew from top-line racing.

At each wheel a pair of massive calipers was mounted in diametric opposition to provide a balanced braking couple that wouldn't bind the disc's splines. Big Girling-style segmental pads were strung on a pair of rods piercing each caliper, and were applied by a relatively small cylinder attached on each inner cheek.

As in so many cases, the Gordinis lacked the power to get close enough to the opposition to show whether or not they were better braked, and the Messier units were far from reliable. An early installation on Jean Lucas' Monza Ferrari showed superiority over the Commendatore's own drum-braked cars, however.

The Messier calipers were more recently revised and matched with a very thin disc, unsplined but mounted with a small degree of flexibility, in the hope that this will suffice. It may, with partial thanks to the great area and resulting low linear wear rate of the Messier pads.

Another interesting movable-disc installation was that of Palmer aircraft-type brakes on the postwar HRG prototype. The disc was actually carried and rotated by the wheel rim, through a series of keys and slots, and the pair of finned calipers

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Racing Brakes

(Continued from page 74)

curved around the *inner* circumference of the disc.

This clever arrangement has perhaps more structural than thermal appeal. Short links instead of slots and keys were used to support a similarly-placed disc on GM's Firebird II, while the American Milan disc brake subscribes to the same basic idea.

As I mentioned earlier, and as you'd readily assume, the discs themselves are attacked by lots more heat per unit volume than comparable brake drums, and we've already seen how hot the latter can become. There's little chance to store this heat, so the disc must concentrate on getting rid of it while fighting abrasion by the friction pads as best it can.

In the infrequent but high-pressure aircraft halts, copper discs proved to be an expensive but easily-damaged way of throwing heat away quickly: for automotive use they're patently unsuited, of course. In their original racing brakes for Jaguar, Dunlop used mild steel discs plated with hard chromium to improve their wear resistance. When these are "dished" more than .020 to .025 inch they must be replaced.

They can't be reconditioned. Now virtually everybody uses cast iron discs with a chromium content to increase surface hardness, an inexpensive and satisfactory solution. In the case of the Girling disc, as an example, .060 inch can also be turned off the faces to clean them up if they're deeply scored or damaged.

Though they work, none of the three materials mentioned have any heat capacity to speak of, and there would still seem to be an opportunity for the Wellworthy folks to whip up an aluminum disc with cast iron faces bonded on by the Al-Fin process. It needn't be overly thick, and would handle heat with a new facility as long as the bond is adequate to the temperatures developed.

Sheer size and detail design also play important parts in the effectiveness of brake discs. The biggest racing discs I have record of are the 12¾-inch units used on the original Jaguar/Dunlops, which were irrefutably effective. At or about the 12-inch level are the Vanwall, the big Girlings and the production Dunlops used by Jaguar, Lister and Ferrari.

The BRM/Lockheeds struck a mean of 10½-inches, while Cooper and Lotus use Girlings as small as nine inches. While discussing calipers we touched on the good opportunity for comparing the performance of Vanwall and Halibrand brakes, which both stem from Goodyear patents.

The California-made discs (of Meehanite, a special cast iron) are an inch and a half smaller in diameter and notably thinner than those fitted by Vanwall, which have by far the better durability and consistency under road racing conditions. I grant that this isn't what the Halibrands were designed for, and use them only to show what makes some disc brakes better than others.

For a contrast closer to the Vanwall, the BRM's front discs are almost identical in size, shape and location to those used by Indy cars, and thus, in spite of the fine design of the Lockheed caliper, they placed the Bourne cars on an immediate braking defensive in relation to the Vanwalls.

The front/rear balance of braking can also be taken account of in disc dimensioning, as illustrated by Jaguar/Dunlop practice. Works-sponsored D-Types in 1956 and '57 had front discs a healthy ⅝-inch thick as opposed to ½-inch at the back, while the Mark IX fits ½-inch discs in front and ⅜ in the rear. This helps accommodate the heat bias toward the front, while the mechanical bias is set by altering the effective radius at which the pads act: greater fore than aft.

A much-touted Vanwall feature has been the radial drilling of the disc, which penetrates to the center only every other visible hole, and thus can have a negligible centrifugal-fan effect — especially at the moderate rpm's achieved by road wheels.

If any such effect can be accomplished by a disc, it would be found in the carefully-vaned parts fitted at the back of the post-1957 BRM and at the wheels of the Firebird II. It's more likely that the success of the Vanwall design lies in the added area for the *radiation* of heat that it provides.

In most racing applications an effort has been made to erect a heat barrier between the discs and the hub bearings or, alternatively, the tires. This can be done by drilling a ring of holes around the hub, as seen on the early Dunlops, or by deeply offsetting the disc in a hat-section contour in addition to the hole-drilling. The latter can be seen in late Messier units and, at an extreme, in the experimental Girlings supplied to Ferrari.

Ted Halibrand usually fixes his discs to big finned and vented magnesium cages which soak up and dissipate heat. The ill-fated Girlings on the V16 BRM had a narrow braking "ring" surface attached to a light alloy carrier by a horde of countersunk machine screws.

This dishing also serves to bring the discs out into the air flow, a point that on Grand Prix cars especially would seem to be of elementary importance. Yet it has been observed on relatively few cars: the Vanwalls, the early Dunlop installation on the 1955 BRM, Alf Francis' Dunlop adaptation for the Moss Maserati (in contrast with the BRM-sponsored fitting of the same-type brake on the same-type car), and the new Dino Ferrari discs. Most others have shrouded the disc and caliper deeply in the wheel, the poorest place for cooling with the exception of inboard rear on a sports car.

After the 1958 season Denis Jenkinson reported that the Vanwalls wearing the Chapman-designed alloy wheels had encountered distortion of the front brake discs due to a wide difference of temperature between the two sides, and had successfully countered this by reinstalling wire wheels at the front only. Denis reasonably feels that this was originally caused by "the solid wheel interrupting air flow," but I doubt it.

Just as in the case of the aluminum-shrouded brake drums of Part II, the alloy wheel disc was probably acting as a fine reflector for radiant heat, bouncing it right

back to the outer side of the brake disc. The greatest virtue of the wire wheel would seem to be the wide-open path that it offers to radiation of heat, there being well-founded doubt nowadays that any worthwhile breezes find their way through the whirling spokes.

Appreciation of this point carries in its wake criticism of the use of the otherwise practical Dunlop disc wheels, found on Jaguars, Listers and BRM's, *inter alia*. These must reflect heat back to the disc and caliper with a real vengeance. Perhaps the Coopers have the right combination with their cast spoked wheel; in any case I feel that all racing brake installations should be evaluated in terms of radiation of heat, particularly discs with their tendency to higher unit temperatures.

Naturally a flow of air over the binders is still mandatory. The '54 D-Types had simple sheet alloy scoops to induce some air over the front discs, but the twin ducts let into the new 1955 nose piece cut the operating temperature by 90°C. For tight-course racing in the U.S., Alfred Momo added underbody scoops for the rear brakes and gouged out the nose ducts to gargantuan dimensions. Another very effective Momo trick was the binding of the brake hoses with asbestos to ward off vapor lock.

If, after all this, we wanted to run off a grudge race between drum and disc brakes, we'd have to bring a 1955 W196 Mercedes (medium chassis, outboard front brakes) and a 1958 Vanwall to the same starting line, preferably the *Start und Ziel* of the Nürburgring. It's likely that even against the fine Mercedes drum brakes the Vanwall would have the better anchors — by a slim margin, and only over the full G.P. distance.

When it is considered that the Vanwall brake embodies most but by no means all of the features felt essential to success in these formative days of the disc principle, and also that the Mercedes drum brake can confidently be said to be the best of its type ever built, it's clear (if it wasn't before) that the disc is the brake of the future. Its adoption by Ferrari has, in fact, made it the brake of today.

With the abdication of Vanwall and Lockheed in 1959, it appears that both the production and racing phases of disc braking will be dominated by the opposed-piston fixed caliper layout championed by Dunlop and Girling, a turn of events which doesn't automatically put a pox on the movable caliper or disc. I hope that the wonderful variety that's marked the first half-dozen years of racing discs won't soon be abandoned; racing drum brakes were never more varied than in their last great year: 1955. With that final knell sounded, and an orison or two for the future, it's time to put a halt to this arresting tale.

—*kel*

Coming Next Month

First Go Kart National

by OCee Ritch

Taylor-Made

(Continued from page 42)

Longish in the stroke, in the fashion of its day, old PK4053 had a displacement of 1074 cc and developed 49 bhp at 5200 rpm on a compression ratio of 7.6/1. The two camshafts were driven by a vertical shaft and bevel gearing, back of the block. A four-speed crash type box was built in unit with the engine and a torque tube enclosed the drive shaft. The brakes, with drums of large diameter as such things went in the '20s, were cable operated. Steering was worm and nut.

It took Geoffrey Taylor two years to build this bolide and thirty seconds to hit on a name for it. Opening an atlas at random, he spotted a Canadian water expanse called Lake Alta. So Alta it was.

Impressed by Taylor's performances with his special in almost every form of competition (it was also, incidentally, his sole personal transportation) friends and acquaintances started waving check books at him and making name-your-price noises. Eventually, not wishing to part with the original, he decided to reproduce the Alta species, and the Alta Car and Engineering Company Ltd., financed by his father, came into being. Geoff designed a small factory on his own drawing board, invited tenders for the construction job, recoiled in horror from the resulting estimates, hired a couple of unskilled laborers and built the place himself. It didn't fall down and it still hasn't. In January of this year, when the Alta company was formally wound up and the assets transferred to the neighboring HRG *fabrik*, it looked at least as permanent and durable as the majority of the homes of light industry dotting this inner Surrey purlieu.

In 1934 he redesigned his engine as far as he was ever going to, although fruitful development work continued throughout the marque's lifetime and periodic variations were rung on the displacement and bore/stroke themes in accordance with the needs of changing times. The '34 reorientation, then, consisted of replacing the roller mains and bigends with plain bearings, uniting the block and crankcase in a single casting (still light alloy), narrowing the valve angle from 90 to 68 degrees, using a gear train instead of a shaft and bevels to drive the camshafts. Later again, two-stage chains were adopted for the camshaft drive, this system being retained right up to and including the 2½ liter Connaughts of the present formula. Taylor's first supercharging essays (to revert to the '30s) revolved around a readymade Roots blower, but this was shortly junked in favor of one he designed and made himself, also Roots type.

To widen the scope of operations, the ancestral eleven-hundred was supplemented by a 1500, in the traditional dimensions of 69 X 100 millimeters, and a 2-liter at 79 X 100 (1996 cc). With a boost of 22 psi from a blower turning at 1½ times engine speed, the 1500 reached an output of better than 200 bhp prewar and the 2-liter hit about 280 at 5800.

In the late '30s, Taylor specialised in standing start sprints on the flat, and with his 2-liter Alta he set a record that has never been beaten — for England's best known course of this type — 80.81 mph

for the s.s. halfmile at Brighton. (Brighton was afterwards extended to a kilometer, so the old records became unassailable).

Apropos Brighton, it was here that Taylor once involuntarily demonstrated his Alta's superiority by winning his class with his crankshaft in two pieces, both driving wheels locked solid and the car traversing the final seventy yards of the course mostly sideways and partly backwards. His sprint 2-liter, like the generality of racing Altas in the mid to late '30s was fitted with a preselector gearbox, and the sundering of the crankshaft — this at around 140 mph — somehow had the effect of jamming the transmission bands on full bite. When he'd fought the thing to a standstill, way past the finish line, and was pinching himself to make sure he was still alive, it rather surprised him to be told "Congratulations — you've won your class", rather than "Congratulations — we're cancelling the rubber tired hearses". Although brawny as well as brainy ("His limbs were cast in manly mould, for hardy sports and contest bold", like Scott's hero), Taylor had needed both sleeves full of arms to prevent the car holing the seafront wall and plopping into the English Channel.

At the Crystal Palace road circuit on another prewar occasion, by roughly the same token, George Abecassis on *his* Alta did indeed make an aquatic plunge, spinning out on a lakeside section and nosediving into the drink.

Continuity, as already noted, was one of the hallmarks of Geoffrey Taylor's work in the engine design field: every Alta engine ever built, for instance, had four cylinders, dual camshafts with the drive at the back, light alloy main castings, wet liners, hemispherical heads, and two valves per cylinder. In the chassis and suspension department, on the other hand, he had a penchant for barking up a succession of different trees in fairly rapid succession.

His first departure from cart-sprung orthodoxy was a layout he launched in 1937, using a channel section frame of monoposto width and vertical slider independent suspension for all four wheels on coil springs. It was with an Alta of this type that Abecassis first started harrying the ERA's on short and twisty circuits; although high built by present day standards (the driver straddled the transmission), this original all-independent Alta undercut the gangling ERA's in stature and at least showed enterprise in banishing the live back axle at a date when ERA thinking hadn't caught up XIX Century de Dion practice.

The Altas didn't have more power than ERA, less in fact, but superior back end adhesion gave the former an advantage in effective acceleration which was often decisive on small circuits like London's Crystal Palace. A feature of this Alta's suspension, incidentally, was that it dispensed with shock absorbers front and rear. The theory was that inherent friction in the vertical sliders made shocks redundant, and so it did, but only in an ideal state of lubrication, which seldom was maintained throughout a race of any considerable length. What the system lacked was consistency and predictability of suspension behaviour. *(Continued on page 80)*

Taylor-Made

(Continued from page 79)

Two minor variations on this chassis theme were a frame using tubes instead of girders for the side members, and a drive line incorporating stepdown gearing to lower the seating position and whole profile of the car. Then, in the summer of '39, too late to wage effective combat in what remained of the prewar racing age, Taylor came up with a second and entirely new exercise in total independence, with transverse torsion bars housed inside tubular crossties and each wheel carried on a single trailing link.

This one had shocks at the back but none in front. The solitary example of the type had originally been built for one of Britain's richest women, heiress Lady Mary Grosvenor, and was raced after the war by R. M. Cowell before his/her biological amendment.

Having gotten vertical coils and lateral torsion bars out of his system, Taylor gave fresh vent to his love of novelty by using rubber in compression as a springing medium. He composed two variations on the rubber theme, the first employing blocks of the stuff secreted out of sight within tubular cross members and compressed via bellcranks connecting with wishbones carrying the road wheels; the second a direct-acting arrangement with the blocks visibly interposed between nether wishbones and reaction brackets. The bellcrank setup was featured on a blown 1½-liter built for the 1½/4½ formula, designated the GP Alta and introduced in 1948; the direct-action geometry came later on 2-liter F2 chassis of various subspecies, including one (1950) that anticipated later Daimler Benz thinking in the matter of full-width bodies and enclosed wheels for *pur sang* racing cars, exemplified by the dishcover edition of the 300SLR Mercedes. Today, just one Alta relic shares Geoffrey Taylor's retirement in a paradisal neck of the wooded Surrey hills, and this is the full-widther he designed for formula racing a clear four years before Stuttgart's illuminati put the same idea into practice.

Although all the Alta engines that ever actually fired were fours, Taylor designed V8's based on his four-bangers at two phases of his career, the first a supercharged 3-liter intended for the 1938/8 formula, the other an unblown 2½ conforming to the free-fuel version of the rules in force today. Specification of the former, and of the car it was to have powered, was detailed in Alta's 1938 catalog, briefly as follows:—Eight 68.75 X 100 mm cylinders in banks of four at 90 deg. included angle; four camshafts, chain driven; tubular chassis with all-independent suspension; wheelbase 96-inches, tread 50½-inches; car weight 1512 pounds; top speed estimated at 180 mph.

In spite of bolstering Alta up to the best of his means, from the profits of the real estate business he conducted on the side, Taylor never really had a hope of getting expensive and ambitious projects like these off the ground. One reason he couldn't was that, so far from encouraging patriotic well-wishers from coming to Alta's succour with subsidies, he declined any part of such schemes, in the same spirit of sturdy independence that predisposed Boswell to "a welsh rabbit and porter with freedom of spirit" rather than "ortolans and burgundy with servility". Geoff had seen what happened to BRM when a multitude of scullions bought the right to boss the chef around, and it didn't appeal to him. At the time he was dredging his personal coffers to finance the proposed 2½-liter V8; a sort of unofficial Alta fan club, expressing its will through the dear-sir columns of the British technical press, sprang into being and tabled a clear-cut plan for fund raising. Gratefully but firmly, Taylor wrote to the editors concerned saying he wouldn't accept a shilling.

The only six-cylinder engine that Geoffrey ever put onto paper was, like the V8's, stillborn. But he did, he asserts, play a principal part in designing the XK Jaguar powerplant, a claim which, until or unless it is weightily contradicted, assures him of greater technical kudos than all his Alta attainments added together. The first inkling I had of any Taylor/Jaguar association came quite casually, almost accidentally, the day I met Geoffrey at a Surrey inn back in January to discuss material for this story. In the course of a preliminary verbal skirmish in the tavern car park I raised the hood of my XK140 to reset the SUs for idle. Looking over my shoulder as I fiddled, Taylor remarked with perfect nonchalance: "Of course, you know I designed this thing, don't you?" I didn't, and unless my education has been sadly neglected, not many of *SCI*'s readers would have either.

The background of the story, as Taylor tells it, goes like this:—In 1934 a consultative engineering partnership was formed between him and Harry Weslake, the celebrated combustion and porting specialist, under the title of Weslake and Taylor Ltd. The company was quartered separately from, but under the same roof as Alta, at Hook. In or around 1943 the partnership received a commission from Jaguar to design a six-cylinder engine to form the heart and centerpiece for their postwar range of passenger cars. Weslake and Taylor went ahead and did just that, the latter assuming responsibility for virtually the whole mechanical side of the deal, the former handling the top end and everything with a bearing on burning and breathing.

Put just like that, of course, the tale obviously suffers from oversimplification, because for one thing it makes no mention of the four cylinder prototypes (XF, XG, XJ) that foreran the eventual XK in the Jaguar alphabet, as revealed by W. M. Heynes, director and chief engineer at Jag, in a widely quoted paper he read before the Institute of Mechanical Engineers in London in April of 1953. Taylor's version of the affair, on the other hand, is fully circumstantial, and I think it rates the space I give it here.

Apropos, one interesting aspect in which Jaguar and Alta practice differs, concerns the valve attack. Whereas the Jag unit, of course, has inverted pistons between cam and valve stem, with hardened biscuits for setting clearances, Alta have always favored pivoted fingers. Fingers are lighter, Taylor says. True, no doubt, but it may be significant that Altas of some vintages

suffered badly from sooted plugs due to surplus oil infiltrating down the valve guides, while Jaguar never experienced this trouble.

Another side venture of Taylor's, unconnected with Alta cars and engines *per se*, was the manufacture of special cylinder heads for Austin Sevens and rockerbox conversions for sidevalve Morris Minors. These Minor makeovers, designed as well as made by the burly burgher of Hook, gave electrifying results, as one of his American customers testified in reporting a 100 percent power increase in *SCI*'s October 1956 issue.

In engineering matters, in fact in any practical context whatever, Taylor's stock precept is and always has been to never discard an idea, however seemingly daffy, until he's proved its uselessness by experiment and test. It was in this mood, after his doctor had told him that his blood pressure was high and warned him against liquor, that he did two characteristic things: one, he bought his own blood pressure test rig (by the book, a layman can't procure such a thing in Britain); two, he deliberately upped his alcohol intake some hundreds percent. What happened? His b.p. went *down*, fast. Don't go and do likewise if you suffer similarly, though, because he admits it afterwards went up again, even faster.

Rationed to welsh rabbit and porter rather than ortolans and burgundy, Taylor didn't ever really develop his promising 1½-liter GP car successfully; and anyway, with the exception of Abecassis it was seldom driven by anyone capable of doing proper justice to its potentialities. Its best performance was placing fifth—after carburetion bodging that cost nearly 4¾ minutes in pitstops—in the 1949 British Grand Prix, handled by Abecassis. In its final form with two-stage blowing the GP Alta once came within a whisker of winning a fairly important Irish race, the 1951 Wakefield Trophy, where it was driven by Joe Kelly, an Irishman whose personal prowess unfortunately wasn't matched by his pit organization. When he was securely leading, having blown off quite formidable antagonists on his way up, he was idiotically signalled to take it easy, Joe complied, and Duncan Hamilton with a 6C Maserati came under Joe's armpit to win by three seconds. This typified the maladroit racecraft practiced by inexperienced Alta owners of successive generations, compounding a series of bitter pills that only the eupeptic Geoff Taylor could have swallowed without choking.

In quest of bonus piston area but unwilling to accept the complication of extra cylinder multiplication, he left the basic design of his engine alone when the time came to beat his wartime sword into peacetime race equipment. The GP mill of 1948 *et seq* was therefore still a four but with the bore and stroke equalized at 78 x 78 mm, making the capacity 1496 cc.

And from this, in turn, he later evolved the unblown 2-liter engine, with eight plugs and dual magnetos, that powered the ultralight Formula 2 Alta raced by the late Peter Whitehead. The same foundation, with cylinders measuring 83.5 x 90 mm, was also the point of departure for the pretty radical development essays embarked on independently by HWM for their F2 contender—the machine that the *Motor* was to credit with "the finest postwar record of all British Cars".

At that period, of course, a record could be Britain's finest without being fine by any absolute standard, and let's don't allow sentimentality to blur our assessment of HWM. John Heath and George Abecassis, the principals in this enterprise, were rightly honored and applauded for the vigor, courage and sheer temerity with which they pitted their backyard hybrids against the might of Italy, all over the continent, Sunday after Sunday. But, this being a real life story, David didn't habitually stone holes in Goliath; it was enough that he twisted the big fellow's tail once in awhile. As for Alta's part in successive HWM campaigns, Denis Jenkinson, by no means the most impressionable of critics, allowed that Taylor's engines were "immensely reliable". Alf Francis, H.W.M.'s head mechanic, whose later work for Moss and Rob Walker has won him a celebrity that few race mechanics achieve, called Taylor "a fine practical engineer but a bit old fashioned at times".

The HWM's, to be candid, were not paragons of reliability, but most of their failures were the result of running-gear breakage and malfunction, rather than engine trouble. Designed, and periodically redesigned, in a hurry, and constructed largely from passenger car components with safety margins that would have induced galloping insomnia in anyone less

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Taylor-Made

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sanguine than the late John Heath, it wasn't surprising they came apart at the joints with some frequency under the stress of racing. It was for instance, a broken hub and the consequent loss of a front wheel that ousted Moss from the sensational Prix de Rome of 1950, in which he'd run rings around the leading Italian talent and set the fastest lap of the race. At Berne two years later, both Abecassis and Collins lost back wheels at speed when their HWM's snapped axle shafts. At La Baule the same summer, Macklin balanced himself to a dicey standstill after a front wheel went over the hedge. . . .

Nevertheless, HWM's aggregate pickings, mostly grabbed off when the continental competition had its back turned, or wasn't out in full force, or suffered a high casualty rate, was not statistically contemptible: first and second, for example, in a *Daily Express* International Trophy at Silverstone . . . a third by Moss, headed only by a couple of 158 Alfas, at Bari . . . two Frontieres GP wins, by Claes in 1950 and Frere in '52 . . . first and fastest lap (Moss again) in the 1951 Wakefield Trophy . . . Harry Schell second at Naples . . . plus innumerable just-outside-the-money placements on practically every circuit in Europe. All this would obviously have been impossible without the Alta contribution because there was only one place HWM *could* go shopping for engines remotely approaching the necessary standard and that was at Hook, Surrey.

The same goes for Connaught too, it you substitute the names of Brooks, Lewis-Evans, Bueb and Fairman for the mettlesome cadets HWM schooled for stardom. Practically identical in essentials with their 1934 ancestors, the 2½-liter Alta-Connaught engines that Connaught were racing up to 1957, when this equipe went out of business, were giving around 260 bhp, alternating between dual two-choke Weber carbs and modified Hilborn-Travers fuel injection. Perhaps constitutionally incapable of causing metal pain, Taylor good humouredly admits that these 93½ x 90 mm powerplants, as delivered to Connaught, were redlined at 5500 rpm, whereas Connaught themselves successfully ran them up to eight thousand. Again, quizzed about a contemporary writer's assertion that the Alta-Connaught engines had to be run at less than their full potential during 1956, due it was alleged, to "limitations in the valve gear", he reacted with a forthrightness and objectivity that few designers could rise to (they're a sensitive species where their brainchildren are aspersed) . Sure, the valve gear had its limitations, he said. The three-bearing camshafts were inadequately supported, for one thing. Somehow, though, this hadn't occurred to him until he read the criticism in the magazine. Having read and pondered it, he sat down at his easel and drew a new set of camshafts with five bearings each. There spoke the "fine practical engineer" who, as well as being "a bit old fashioned at times" has the honesty to look upon his handiwork and sometimes find it wanting.

—dm

Formula K

(Continued from page 31)

The K KART goes the wide-frame route, with 24 inches between rails, and is offered completed only, fully painted and upholstered at $189.50. Featuring the Clinton A-490 with a Mercury clutch, the K gives aluminum wheels, full circle steering wheel, sissy rails and a "kill button" on the wheel. Hand operated friction brake rubbing on the tires are another item on this midwest car.

A note here on the status of clutches may be in order: Centrifugal clutches, which are attached to the engines on lawn mowers and so on, were found unreliable at high rpm and all racing Karts have generally dispensed with them entirely. To start the little bombs, one was shoved by an athletic friend until the one-lunger fired up. The car remained in gear at all times. Recently the demand for this sort of equipment has prompted engineering advances and there are now clutches on the market which will stand the abuse. With the clutch, the engine is started on a pull cord, like an outboard, and one can idle or move off slowly by merely applying increased throttle. Some cars, as noted, come so equipped. The units will be discussed with accessories.

Out in Iowa they are building a kind of progressive instrument called the GOPHER. It has a two-piece frame wherein the rear section forms the steering support and engine mount overlapping the front section which hoops up to make the seat back. Ingenious, to say the least, with the frame rails constituting side supports for the seat cushion. At $169.50, ready to run, it also uses the A-490 2-cycle Clinton.

The SIMPLEX, manufactured in New Orleans, Louisiana, is built along the same lines as most other machines with one notable improvement. Some thought was given to proper steering geometry which on most other karts loses out to simplicity. Ideally, the steering arms at the kingpins should be angled so that an extension of their lines would meet at the center of the rear axle. This would give the desired "Ackerman" effect in turns, turning the inside wheel more than the outside one, preventing plowing and thus reducing drag. Since this is difficult to arrange on a kart, the designers of the SIMPLEX have put a plate on the end of the steering column instead of just bending the end of the column into a steering arm. This triangular plate carries two tie-rod pivots at the top and is fixed to the steering column at the bottom. The left tie-rod is joined to the right pivot and vice versa, the rods crossing at the center. When the steering wheel is turned, the difference in leverage is such that the wheel on the inside of the turn (which tracks a shorter radius) is moved further than the outside one. The SIMPLEX is priced at $189.00 for a single-engined model, fully assembled and painted. Upholstery is optional.

Ingles-Borelli's CARETTA, seems to fall into the Ferrari category since seldom are any two identical. A "standard model" is listed, but the two partners seem to prefer the custom business and offer such an intriguing array of modifications that they

have snaffled this end of the business to a singular degree. Their stocker at $195 is a showpiece, ready to go, with dropped front axle, three-spoke wheel and real pro looking pedals. If you want esoterics such as chromed side rails, deep upholstery and knock-off hubs, these are the men to see.

Just short of the $200 mark is the TUFF CART at $199.50. This midget makes a big selling point out of a hefty internal expanding brake and, with the emphasis on road-course type racing as it is, the brakes are equally as important as the engine, chassis and driver . . . don't quote me, of course. Carrying an unconditional guarantee against breakage, the TUFF CART carries Knobby 11-inch tires on the rear and is also available as a dual engined job.

Frank Kurtis, (the same one who builds Indy cars) has lent his talents to a torsion-bar sprung buggy with two-wheel drive (most Karts drive only one rear wheel) and adjustable friction shocks. Selling for $258 completed with Clinton A-400, the KURTIS KART is said to be the forerunner of a powerful beast mounting the fabulous Japanese Yamaha two-stroke cycle engine that turns about 14,000 rpm. In which case, look out!

Above the magic two century, we begin to encounter those engineering advances so dear to the heart of the born fixer. With a basic proposition as simple in design and execution as the Kart, it is a lodestone for improvers. With refinements, naturally, come a higher first cost and a narrower market for accessories, although a Karter will add $250 in extras and modifications to his $150 vehicle, he'll turn blue at the mention of a $400 price tag. Nonetheless, more firms are going up the ladder all the time.

CAD-CART is just about tops in price for a "standard model" and in this beautiful job there has been no compromise with quality at any point. The chrome-moly tube frame is heli-arc welded; steering is rack-and-pinion; hardened and ground king pins with grease fittings are employed; (most carts use bolts) a "dragster-type" steering wheel with molded grips tops the column and a precise steering geometry with 10° of caster, 4° camber is built in. Frame rails on this machine end in Fafnir self-aligning ball bearing carriers and a solid, heat treated rear axle is driven by a center-mounted engine with a clutch and jack-shaft arrangement allowing for quick gear changes. Francis de Rocco, who builds the cars, has his own permanent-mold cast aluminum wheels and either anodizes or cad plates everything including the frame! A "490" is stock but this rig cries out for one of the meatier powerplants.

Having sampled a few of the putt putts in a kind of quick once around, and with an idea of what's on the market, it may be as well to go into this subject of engines and . . . the burgeoning group of accessories.

Basic engine, as the eagle eyed reader will have noted, is the Clinton A-400 or A-490. The only difference between the two is needle roller bearings on both ends of the connecting rod. The 490, with these bearings, sells for a couple of

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Formula K

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dollars more, and is, in theory at least, slightly superior. These 2½-hp air-cooled single-cylinder screamers have replaced the West Bend 750 which got the sport started. Unfortunately, the 750 was a discontinued item and when the supply ran out, that was it. Reconditioned West Bend 750's can be purchased for as little as $24.50, some new in surplus stores for even less. Parts, of course, may become a problem. The Clinton and others are now produced specifically for powered playthings, as well as for the mowers and chain saws they originally mated with, so there is no shortage of either engines or parts.

Within the GKCA or Formula K classes, fall these production powerplants:

CLASS A
(up to 5.8 ci, under $100 list price)

	CI	HP	PRICE
Clinton 400	5.1	2.5	$43.50
Clinton 490	5.1	2.5	$45.50
West Bend	5.1	3.0	$84.50

CLASS A SUPER
(up to 5.8 ci, over $100 list price)

Homelite VI	5.1	6.0	$250.00

CLASS B
(5.8-11.6 ci, under $200 list price)

West Bend	6.45	4.0	$86.75
West Bend	7.0	5.5	$87.50
Power Products	8.1	5.5	$87.75

CLASS B SUPER
(5.8-11.6 ci, over $200 list price)

Homelite VII	8.0	7.0	—
McCullough 77	7.3	7.0	$289.95
McCullough 99	9.9	8.0	$340.00

Class C, 11.6 to 16.5 ci unsupercharged or 5.8 blown, contains no readily available engine so here we find the "drone" or offhand motorcycle power supply utilized or the dual and triple-engined Karts. A great discrepancy in prices can be observed in the above tabulation and the difference is, naturally, in quality of material and workmanship. With the lower priced units intended only for light application, mowers and occasional-use chain saws, there is no need for heat-treated, hardened-and-ground, close-tolerance components. Consequently, the under $50 pieces develop their rated power around 3800 rpm and can be run at this speed with good reliability. Push them up to 5500 to get more than 3 hp and life expectancy falls way off. The $85 types have needle bearing rods and cranks and generally stronger composition making them safe for the higher rev limits. The really costly models are designed for day-after-day abuse at high speeds (6500 and up) and represent a practically trouble-free investment.

Weight is another factor in making a choice. The Power Products 5.1 ci model, for example, weighs only 14 lbs. as against 33 for some of the less costly types.

With more than 90% of the 10,000 existing Karts being propelled by the low-price echelon, there is a booming market in speed and power equipment. Here are a few items designed to increase the horsepower, appearance or longevity of your Clinton: DUAL PROGRESSIVE CARBURETION has been developed by Bob Palmini, a Corvette tuner of some reputation who has installed a miniature dyno in his shop to test the tiny engines. The added carb is a Tillotson and both it and the stock Clinton *vergaser* mount on a Y manifold. Dynamometer readings show an impressive 40% gain in power. Peak torque is moved up the RPM scale by a couple of thousand revs, too. A complete unit including extra carb sells for $18.70. TUNED EXHAUST STACKS: Palmini gets $5.95 for this cast aluminum-goodie which doubles the torque (3.2 lb/ft to 6.6 lb/ft) at 3500 rpm. Chuck Potvin asks $9.95 for his scavenger which produces the same effect but is polished to a brilliant lustre. VELOCITY STACKS, tuned intake tubes to add "ram" effect, also from Palmini for $3.95 each. A FUEL INJECTOR to replace stock carburetor is offered by Go Kart Co. for $21.50. Easier starting and instant thottle response are claimed advantages. A pressurized tank is recommended for this extra. HIGH COMPRESSION PISTONS cam-ground from heat-treated copper-nickle alloy are now being turned out by the ubiquitous Palmini along with converted roller bearing rods on an exchange basis. In the works are an automatic spark advance and a vertical motor mount.

Related to the engine, but not a part of it, we find a slug of engine and wheel sprockets for varying gear ratios and chain guards of a special alloy from the same supplier.

Miniature Moon Discs, polished aluminum hubcaps for the tiny 6" or 5" wheels, have been scaled down from the popular hotrodder's item.

Special vacuum cast aluminum wheels, 50% stronger than steel and saving 8 lbs per car, can be had from Moss Midjet Sales. Cast aluminum steering wheels in a full circle pattern to replace yokes are also useful dress-up items made by several outfits.

Naturally, tires have come in for considerable attention and a line of special Knobby and treadless "Slick" skins are dispensed by a number of firms, while Goodyear, Goodrich, Firestone, and General make original equipment tires for the small wheel sizes. Where maximum pressure is about 25 lbs, a highly accurate low-pressure tire gage has been found desirable by the racing enthusiast and Go Kart Co. imports these items from Germany. The tires themselves seem to be the biggest single item of competition expense, once the purchase of the car has been completed. It is possible to go through a set of rear slicks on a hard afternoon with a tab of about $16. More conservative driving and on a less demanding course will cut the bill considerably.

In the starting and stopping line, with a 12-tooth sprocket for #35 chain, the Mercury Clutch for 2½-3 hp engines at $12.50 offers relief to tired pushers. Comet Industries has the same package at the same price with additional extras in the form of 10-11-&-12-tooth sprockets for #41 chain also in production as well as optional calibrated engaging speeds from 1200 to 4000 rpm. Internal expanding brakes are built by Moss and Hollywood Midget Cars and Bug Engineering. The

former are both aluminum shoe arrangements, identical to old style mechanical auto brakes and Bug's is a single shoe of a flexible steel. All will lock up Kart wheels from pedal pressure.

For driver comfort and needs there are Crash Hats, goggles, coveralls and motorcycle leathers; part of a growing sport which promises to spread to other continents at any moment.

Put them all together and they can spell $300. This is still a far cry from the least expensive way heretofore proposed for going motoracing. But — bear with us . . .

In compiling the data used as the basis for this article, we asked a man who has been in the Kart field since the second one was built (and who has the scars to prove it) to give some unbiased advice to readers who are contemplating the sport. "Suppose," we said, "one of our audience has read a few bits of scrap on Karting and wants to have a fling at the Formula. How can he make a choice from the list of offerings? What should he buy?"

"How much money has he got?" was the somewhat ungrammatical response.

"Umm . . . suppose he has a couple of hundred dollars", we ventured.

"Then he should spend it."

"All for the Kart?" we persisted.

"Certainly. Here's the thing: You get what you pay for in this business just as in any other. Buy the best you can afford at the beginning. You'll be putting more money into it all along anyway, either to keep up or get ahead."

"You're actually saying that Formula K is going to be another case where the man with the most money wins."

"Precisely! Now, let's go take a look at my new Class C custom job that is being chromed all over, including the tires. Costing me $750."

"Wow! Do you win all the races?" we breathed.

"Nope. My wife keeps beating me with her Class A Go Kart stocker. Can't figure that out, either."

Well, that's the way it goes.

However, unless your wife has more skill than you, there is still an opportunity. And, for a while yet, K is for the Kommon Man.

—OCT

KART MANUFACTURERS DIRECTORY

The Acer Co., P.O. Box 44, Cockeyesville, Maryland (ACER RACER)
Acorn Tool Co., Cincinnati, Ohio (ZOOMALONG)
Arnold Dain Corp., Box 77, Mahopac, N.Y.
Auto Craft, 1310 E. 44th, Hutichson, Kan.
Bug Engineering, Box 91, W. Covina, Calif. (BUG)
Cad Cart Co., 5701 S. San Pedro St., Los Angeles, Cal. (CAD CART)
Cummings Enterprises, Washington, Ga. (PUTTNIK)
The Dunn Co., 222 2nd Ave., Des Moines, Iowa (SKAT KAT)
Echo Engineering, 3042 Sunset Blvd., Los Angeles, Calif. (VOLKS CART)
Everett Equipment Co., 25025 Telegraph Rd., Southfield, Mich.

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Formula K

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Fox Go-Boy Carts, Box 621C, Janesville, Wisconsin (FOX GO-BOY)
Go Kart Mfg. Co., 6300 Irwindale, Azusa, Calif. (GO KART)
Gutknecht Enterprises, 738 11th St., Nevada, Iowa (GOPHER)
Hollywood Midget Cars, 2280 W. Colorado, Los Angeles, Calif. (WEE BIRD)
Hot Cart Mfg. Co., 9116½ Sepulveda Blvd., San Fernando, Calif.
Hovey Hawk, 701 Heints Ave., Berkeley, Calif. (HOVEY HAWK)
Ben Hunt & Son, 14 Palouse St., Walla Walla, Washington (CAPER CART)
Ingels & Borelli, 2100 Echo Park Ave., Los Angeles 26, Calif. (CARETTA)
Frank Kurtis, 520 W. Colorado, Glendale 4, Calif. (KURTIS KART)
L. H. Knost Co., P.O. Box 415, Carthage, Mo. (K KART)
500 Industries, 108 E. 6th St., Fremont, Nebraska (LIL 500)
Mantis Kart Co., P.O. Box 104, Duarte, Calif. (MANTIS)
Mantz Mfg. Co., 6359 Florence Ave., Bell Gardens, Calif. (ZIPPER)
Mark Industries, 1352 36th Ave., Columbus, Nebraska (MUSTANG)
Mitchell Co., Streetsboro Rd., Canton 6, Ohio (BANTAM KART)
Munson Sales, 409 E. Main St., Muncie, Ind.
Pervan Tooling Co., 2112 S. Sepulveda, Los Angeles, Calif. (PIXIE)
Potvin Engineering, 700 N. Los Angeles St., Anaheim, Calif. (DRAG-N-FLY)
Reed Engineering, 2054 W. Slauson Ave., Los Angeles, Calif. (COOL CART)
Riss Sales Co., 1275 Elm, Glendale, Calif. (GOONEY CART)
Rupp Mfg. Co., Bowman St., Mansfield, Ohio (DART KART)
Simplex Mfg. Corp., 540 No. Carrollton, New Orleans, La. (SIMPLEX)
Spinster Corp., 22473 Cora Ave., Farmington, Mich. (BOA)
Wedge Mfg. Co., 1763 W. 48th, Los Angeles, Calif.
Walborg Mfg. Co., 3103 Pacific Coast Hwy., Torrance, Calif.

Argentina Grand Prix

(Continued from page 66)

with the spanking, multi-million plant, but it was too late now. Everyone remembered the haste in designing and building this autodrome — the dubious competence of the so-called technical advisors — but criticism was always made in a low voice . . . just in case. Criticizing openly the pride and joy of the regime could be a bit unhealthy. At any rate, this subject made good material for pre-race powwowing.

Training sessions had barely gotten under way and it was apparent that the Maseratis were no match for the Ferraris. The latter presented a formidable *équipe*: Farina, Gonzalez, Hawthorn and relief-driver Maglioli. Decidely underpowered by comparison, and Gordini team was on hand, with Behra, Bayol and Loyer. Farina got the pole with a qualifying mark of 1:44.80 (83.572 mph) on Course Number Two. Gonzalez was next; then Fangio and Hawthorn.

Farina started the race well in front, followed by Fangio and Hawthorn; Gonzalez made a poor start but through some extremely fast driving he wrested the lead from Farina on the 15th lap. At the end of the 30 laps, the Ferrari team captured the first three spots; Fangio was running fourth and losing ground when the rain came . . . Gonzalez spun out. Farina pulled in for his rain-visor and Hawthorn was unable to check Fangio's furious charge under the deluge. Fangio was leading at 77.29 mph, on the 40th lap. The excitement of the crowd would be difficult to describe accurately; they were taking the drenching rain with real stoicism. In a few laps, the Ferrari team had rearranged itself and was ready again; the downpour subsided and better traction helped them considerably. Gonzalez and Farina overtook Fangio, but after a few comparatively dry laps, rain started again — a lot heavier this time. The faster Ferraris had to slow down and Fangio attacked, resuming the lead. Hawthorn was disqualified for being pushed to a start after a spin. In the lead now, Fangio made a stop for tires; Ferrari pit-manager Ugolini filed a protest claiming five men (two more than allowable number) had actually worked on Fangio's car at the pit, and even before knowing the judges' decision he ordered his drivers to slow down and displayed a signal board which read "Fangio out of Race". Fangio re-started and deprived Farina and Gonzalez of their momentary lead in a few laps. As the three-hour-signal was given, Fangio got the checkered flag a winner at 70.14 mph average. After him came Farina, Gonzalez and Trintignant (privately-entered 2.5 Ferrari). Ugolini's protest was turned down — his later appeal to the FIA stirred things up again but the results were the same. Nevertheless, argument on this issue hasn't died yet . . .

1954 BUENOS AIRES CITY GRAND PRIX

Maurice Trintignant, in his 2.5 Ferrari was the surprise winner of this 50-lap, free-for-all race as leader Mike Hawthorn spun off the road in the last curve with half a mile to go to the checkered flag! This race was, as usual, a non-formula,

non-championship event, but the new F-1 cars could easily beat the bigger-bore "veterans". Rookie Umberto Miglioli, co-winner of the 1,000 Kilometer race the week before — was driving one of the Ferraris and he led for the first three laps, to be passed by Farina and Hawthorn on the fourth. Fangio made a poor start, stopped for plugs and soon after getting back in the race, his car stalled with a broken axle shaft. Similar trouble forced out his teammate Marimon. Differential failure eliminated Farina; Hawthorn took the lead. Gonzalez, running second, stopped for relief; the Ferrari personnel had not anticipated this emergency — Farina was not ready or even around the pit and this simple change meant the loss of 40 seconds.

Enrico Plate, retired from driving, now acting as chief mechanic and pit-manager for De Graffenreid, was killed while standing in front of his pit, hit by a Maserati driven by Daponte that spun into the pit apron. Until the last lap, positions were: Hawthorn, Trintignant, Mieres (2.5 Maserati) and Farina (in Gonzalez' car). The checkered flag was ready to receive the winner and the crowd was already cheering their new favorite, but Hawthorn did not show: his engine had blown up sending the Ferrari into a spin on the last curve, a few yards before entering the homestretch. Observers claimed Hawthorn had traveled too long in second gear on the twisty section of the course, the blowup would be the result of this over-revving. Extreme heat and fatigue have played tricks too often on the drivers near the end of races — the "Temporada" is run in the middle of summer. The Grand Prix literally fell in Trintignant's lap; Mieres came in second and Farina (on Gonzalez' car) third. Trintignant gave Hawthorn a lift as he drove by during the extra lap: unlucky Mike finished the race riding piggy-back on the tail of the light-blue Ferrari.

—va

Coming Next Month

First Go Kart National

by OCee Ritch

Royces That Raced

by Dennis May

Impressions Of The 1960 Corvette

by Karl Ludvigsen

Lightweight Londoner

by Dennis May

Tony Brooks

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you had a chance of, you know, doing better." That year the Fraser-Nash produced the first Brooks victory although he can't remember where it was and didn't bother to write it down. The Fraser-Nash equipe was impressed and toward the end of the season Brooks was driving a works car.

In 1954 the pace quickened. "The Aston-Martin team asked me to have a try and that went all right. I was on the team with Reg Parnell, Roy Salvadori, Peter Collins and Peter Walker. John Riseley Prichard was with us and he had a Formula II Connaught which he asked me to drive. That went all right." Brooks motored quickly but unspectacularly with Aston and the Connaught through 1954 and most of 1955. Then came the day that rocked the racing world.

Brooks' steady record with the FII Connaught had prompted the works to offer him a FI ride in the Grand Prix of Syracuse, the last FI race on the 1955 calendar. Mercedes had packed up its trophies and gone home at the end of the championship season, but Connaught looked to be overpowered by a Maserati works team featuring Villoresi, Musso and Schell.

Connaught was not exactly loaded for bear. As Brooks puts it, "We didn't practice much because we didn't want to wear out the car. Of course I had to do a few laps to learn the circuit. It's a very hard circuit and I'd never been there before.

"Musso and I started out together. He had the lead for a while and then I had it; we were dicing quite a bit. Then he fell behind. I wasn't pushing or anything. Always go as quick as you feel like; never force anything.

"I was quite a bit ahead when the race was over. I suppose it was one of those story book things. It was my first ride in a Formula I car and it was the first time in 32 years a British car and driver had won a Formula I Grand Prix." A little horn-tooting at this point could be expected, but not from Brooks. "It was quite encouraging but one isolated race doesn't prove much."

In 1956 he was firmly on the ride roster; Aston for sports (where he stayed until this season) and BRM for GP events. "BRM weren't in any Grand Prix except the British GP at Silverstone," and Brooks adds calmly, "that's where I nearly killed myself."

"I was doing all right until the throttle started sticking. I went into the pits and they worked on it. Right after the pits there is a bend which I'd been taking nearly flat out, but of course after I came out of the pits I was going slower. I imagine that saved my life.

"If you made the slightest mistake in the BRM in those days you lost it. The car had absolutely no road-holding whatsoever. Well, the throttle stuck again and I went two feet on the grass. In a Ferrari nothing would have happened, but the BRM threw me out and then burned itself out. I just broke my jaw. No, I'm no fan of seat straps."

After his jaw was patched up Brooks finished his years at dental school by qualifying in December as a dental surgeon. His summer work behind the wheel prevented him from opening a private practice so he joined the staff of a Manchester hospital. (Since moving to London last year he has signed up with a hospital there.)

The next season, 1957, brought a bid from Vanwall, based mainly on a second with a BRM in the Aintree "200" the year before. It was the first time a BRM had made it to the finish line in a major race and it didn't happen again for 18 months. The Vanwalls didn't perk right until the end of the season, but in an Aston sports car Brooks nailed down his second major victory. Beating Fangio, Moss, Collins and Musso he became the first Briton since Dick Seaman to win the 1,000 Kilometers of the Nurburgring.

Triumph and then near tragedy: "It was 3 o'clock in the morning at Le Mans. I jumped in the car at the pits and after going up through the gears it jammed in fourth. I was so busy trying to get it out I didn't notice the corner (Tertre Rouge) coming up.

"While I was busy sorting out the corner I think it slipped out of gear. It was a bad place to lose your power. There was a high sandbank on the outside and the car ran up it, but instead of running back down it flipped over and landed partly on the sandbank and partly on my legs in the line of the curve.

"I couldn't move and I was a bit worried whether it would catch fire or something like that. Then Magioli came around the corner in a Porsche and knocked the car off me. I didn't break anything but I had tremendous cuts and abrasions. It pretty much took the go out of me for the season."

Brooks did have one more race that year, the British GP a fortnight later. He was feeling none too chipper when Moss' Vanwall blew up. Brooks turned over his car to Stirling who went on to achieve the "all-green" British GP victory which had eluded the English for so long.

Last year Brooks quietly collected three championship GP's, one less than Moss and two more than Hawthorn. He did it at the Grand Prix of Europe at Spa, the Italian GP at Monza and the German GP at the Nurburgring. It was Brooks' second major victory within two years at the Nurburgring, which with its 178 turns per 14 mile lap is the most demanding of all circuits. As any record-reader could gather, Brooks likes the Nurburgring. The love affair is not a casual one. His feeling toward the circuit is the foundation of his interest in, and attitude toward, motor racing.

"The Nurburgring is the best circuit in the world. It provides such variety and contrast that it resembles a true road circuit. You don't come up to the same stupid corner every minute and a half. The idea which was the basis of motor racing was to drive as fast as possible on public roads which for safety were closed to the public. Anything else is circus stuff. It's not motor racing."

Brooks, the purist, finds little attraction in the various sports which have

evolved from this ancient principle. Drag racing, the Indianapolis "500" and speed runs on the salt flats are, in his view, "a form of racing but not motor racing. They are a spectacle in which cars take part but they bear little relation to the true concept of motor racing so I'm not particularly interested." Brooks' strict adherence to the "closed public roads" principle is evident because in marked contrast to most GP drivers, he is very conservative in wheeling about in his town car, an Aston DB2-4 Saloon. "Fast town driving," says Brooks gravely, "is very dangerous."

Brooks also finds little fun in GP and sports car racing on circuits which do not resemble true roads. The run through the streets of Monaco comes off very well in Brooks' estimation, but Britain's three main circuits, and especially Sebring, miss the mark. "Aintree's not much; Goodwood has some of the characteristics of a road circuit; Silverstone has bred English racing but that's about all there is to say for it. Sebring is really quite awful. It's very rough, there are puddles all over the place when it rains — a true road slopes down from the center—and those barrels! Drivers can cut in and out of them to turn quick practice laps. Why don't they take away the barrels and just have a straight 200 feet wide? Imagine having a championship race on a circuit marked out with barrels! It's really shocking. Sebring is as far removed from a true road circuit as you can possibly get."

The Le Mans circuit is a good one, Brooks says, but he dislikes the race as the extreme example of a feature of sports car races to which he strongly objects. "Some people believe I don't like to drive sports cars but that's not right. I like 3 liter sports cars very much; it's the way they run the races that disturbs me. In Grand Prix racing you have 15 or so cars of roughly equal capability. To drive at LeMans for 24 hours with some cars capable of 170 miles an hour and some capable of 100 is purely ridiculous. What makes it worse is they don't sift the drivers. It's quite dangerous."

To Brooks, motor racing should not be a matter of life and death. "I take it seriously, but not deadly seriously. I don't take it seriously enough to stick my neck out. There are ways of driving and ways of not driving. Some people really stick their necks out. You feel it's only a matter of time. Certainly motor racing is dangerous, but by being careful you can take a lot of the risks out of it. You can't take all the risks out of life. If you carried the thing to the extreme you'd stay in bed all day and hope the roof didn't fall in."

Has Brooks tried to pattern his driving style after some other driver? Tony shudders at the thought. "That is the absolute worst thing to do. Driving should be a natural thing. If you force yourself to drive like somebody else you're in trouble. If you can't drive quickly naturally then you should stick to club racing. But if you find speed comes more easily, then give it a go.

"I guess we all admired Fangio. He never copied anybody in his life. He just

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Tony Brooks

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drove in the way he found most comfortable and most effective. I think that's the only way. For me it just worked out quicker and quicker. You can't do it suddenly, you have to work up to it. If your ability isn't enough to win the race, don't try. And if you ever frighten yourself, I don't mean if some driver loses it in front of you, but if you ever frighten yourself then you're going too quickly and you'd better slow down. Never force anything."

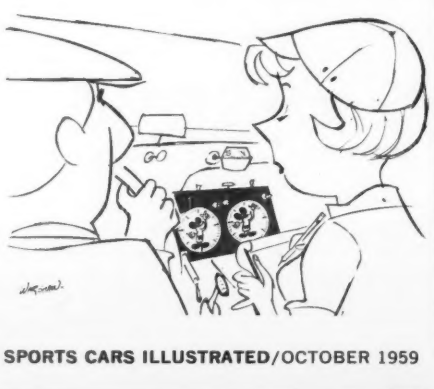
Brooks' Never Force Anything dictum applies to the car as well as the driver and it has endeared him to the owners of the cars he drives. "It's really quite stupid to over-rev. If you don't finish the race you can't win it. You may finish a race at five miles an hour and win it because everybody else is out."

In contrast to his former teammate Moss, Brooks finishes virtually every race he starts. His chances of finishing are even better this season now that he is on Enzo Ferrari's sturdy creations. But Brooks' attitude toward Ferrari would stun most drivers longing for a seat in the big red cars. "The cars are very good but I like the Ferrari team, which is perhaps more important than the cars. Motor racing is my hobby, not my business, and I want to enjoy it. When it ceases to be enjoyable then I shall stop. I don't have any particular goal. Every winter I consider whether to give it up. One must weigh the pros and cons. The thing to do one year may not be the thing to do the next year."

Although not yet the fastest GP driver, the steady combination of Brooks on Ferrari is an excellent bet for the world championship. This evokes notably little enthusiasm from Tony. "It gets all out of proportion, this world championship. The idea is to win the race in which you are competing at the time, not win nine points or finish second or third so many times. Last year I won three races and I considered it a very satisfactory season. The world championship is a good thing in that it has interested the press and the public in motor racing, but aside from that I don't think it tells much."

So while some men busy themselves collecting stamps or string, Charles Anthony Standish Brooks, D.D.S., will continue motoring slowly about town and quickly about the circuits in a dedicated search for racing victories, not an unusual hobby to pursue in an Alfa at Lime Rock or VIR but quite novel in a works Ferrari at Monaco and the Nurburgring.

—s mcn



Indianapolis:

(Continued from page 61)

If any one fact was brought forward forcibly, it is bring your engines, but leave your chassis at home. The Maserati entered by Luigi Zanetti may have been an acceptable piece of equipment at Monza, but at Indianapolis the car was beaten even before it was unloaded.

To a slight degree, the chassis was patterned after the roadster-type automobile specifically constructed for the 500. The engine was mounted to the left, the driver's cockpit to the right. But there the resemblance ends. The suspension on this foreigner is completely dominated by road race thinking, and the four-speed transmission just doesn't have any purpose at the Speedway. The Maserati had the usual independent front plus De Dion rear which characterizes a road job. The four-speed box was mounted integrally with the rear differential unit, then the Maser sported a second transmission bolted on the back of the engine which essentially was a two-speed in-and-out unit.

Zanetti knew after he had been at the track three days that he had been taken by the Milan Automobile Club. He said the Milan club had guaranteed him he would make the race, and of course, the Eldorado Spl's 136.395 mph with Ralph Liguori at the wheel didn't even come close. He held a special press conference following the final day of qualification, and apologized for not doing better, adding that nobody in Europe really understood Indianapolis. The Italian sportsman stated he was going to ask Maserati to build a special car for the Hoosier classic, and possibly they will, providing someone coughs up the necessary "lotsa lire".

A different situation existed with the Maserati-powered Frank Arciero Spl. which was the old Lindsey Hopkins' Kurtis chassis that Bill Vukovich aviated off the back stretch in 1955. The 255-cubic inch V-8 posted practice speeds in the 142 mph bracket, giving hope to the garage fraternity that the eight-banger was going to make the program.

The Arciero Spl. was brought to the Speedway by a pair of sports car mechanics, Dick Pruett and Ray Sopp. To the everlasting credit of the guys who race this park, everybody offered them advice. And what's most important, it was the right kind of advice.

Pruet, who was functioning as chief mechanic, had his share of headaches with the engine, for as the pace becomes more rapid the overstressing begins to have detrimental effects on the detachable head and block design. The V-8 is cast from an aluminum alloy, and the contraction qualities of the metal generated considerable leakage wherever two surfaces attempted to mate. A good example of this warpage occurred between the head and block at a point where the intake ports gave access to the combustion chamber. In using alcohol for a fuel, the cooling properties of the mixture contracted the metal at this particular point just enough to permit the combustion chamber pressures to blow past the gasket.

Pruett solved the problem by having a groove cut around the edge of the individ-

ual combustion chambers, then slipped in a copper O-ring to seal the gap between the head and the inserted wet-liner sleeves. The Meyer-Drake beats this rap simply by having an integral head and block.

The best performance displayed by the Arciero car had Shorty Templeman coming off the number four corner and down to the starting line one-half second slower than the fastest cars, and one-half second faster than the slowest cars. Much development work needs to be done to keep this V-8 from bailing overboard both oil and water. In fact, this was the trouble which caused it to be left standing in line when qualifications closed on May 24th. An eight-cylinder is never going to have as much torque as a four, so the path which must be followed to develop the Maserati engine for Indianapolis includes improved breathing characteristics, plus the ability to turn 7500 rpm all day long.

The Novis never got out of bed. The fuel injection system specially designed for the two supercharged brutes kicked up such a fuss that Dempsey Wilson's belated last day qualification attempt produced a sluggish 134 mph despite a solid month of day and night work by chief mechanic Jean Marcenac.

During the practice session, the blower would begin to build up pressure as engine rpm's rose. When full throttle was applied as the machine came down the chute, the engine would "sneeze" back in the manifold and blow the pop-off valve off its seat. Upon making the original installation of the injection system on the supercharger, Marcenac and manufacturer Stu Hilborn experimented with two types. One type ran all the fuel through the blower. The other injected directly into the ports with a portion going through the supercharger to control the temperature. The method of injecting into the ports provided more power, but moving all the fuel through the supercharger gave smoother throttle control, so this was the one decided upon.

The installation of the injectors alone increased the blower pressure 12½ pounds, generating the pre-ignition condition which caused the engine to backfire. As a last resort, the crew dropped the gear on the impeller to make it turn slower, installed new pistons with a lower compression ratio, and richened the jets so a maximum amount of fuel would hold down detonation. But it was to no avail as the engine wouldn't put out under these conditions, so Marcenac broke camp and promised he'd be back during the summer to work out the bugs.

Something old, something new, something borrowed, something blew. That's the story of Jimmy Bryan in this year's classic. If ever there was a case of a team that couldn't seem to do anything right, this was it. The troubles were not due to lackadaisical workmanship, because George Salih, owner and chief mechanic on the car, is a meticulous craftsman. But everything seemed to go wrong during the month, and the crowning blow came when the 1958 winner couldn't get his car in gear at the starting line, thereby dropping to last place before the race even began. After he did get going, he traveled a total

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Escort

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petrol fillers, a large sliding window in the carrying department and a standard car aerial. The navigator's side has another sliding window and a fifteen-foot short-wave aerial. An electric wiper, swivel spotlamp and reverse lamp will take care of most contingencies at the rear.

The owner took 15 minutes to explain the internal appearance. Starting on the dashboard to the left of the navigator are three brass cocks—2 for changing from the six to the fourteen gallon petrol tanks and the third for a vacuum gauge to check for gasket leaks etc. Below these were six on-off switches for map light, burglar alarm, (when anything is turned on the horn blows) coffee percolator (built in behind the seats) electric shaver outlets, generator switch (to change over the two generators in order not to burn anything out if one of the two batteries is removed) and finally navigators swivel spotlight. Next came an inside temperature gauge and below it an oil temperature gauge, then trouble lamp sockets, change over switch from the standard mechanical fuel pump to one of two S.U. electric pumps and demister switch

Across the top of the dash are three gauges for engine water temperature, 14 gallon fuel tank and oil pressure while below them were a battery capacity indicator, radiator water temperature gauge and the independent switches for the two fog lamps. Next, in the middle of the dash are the three standard Ford controls (clock, lights and starter) to the right of which are a hood release knob, ammeter for the 65-amp car battery and overdrive manual knob, ignition key and just to the left of the steering column, a Halda speed pilot. Above the steering column are the two standard Ford dials and warning lights, a fuel gauge for the six gallon fuel tank and speedo. To the right of the steering column is a medium-wave radio and below it switches for the battery capacity meter, two-speed Delco wipers, the light inside Halda speed pilot and knobs for suction horns, windscreen washers and heaters. As the dash was full the owner has built an auxilliary dash around the remote gear change lever and this supports a microphone for the tape recorder (fitted between the seats) a shortwave radio, switches for the rear-facing lights and general switches for the radios and tape recorder. Recordings can be taken from either radios or the microphone while the vehicle is in motion. A 12″ speaker on the roof with a 9″ speaker plus the 5″ speaker in the tape recorder take care of the reproduction. All radio equipment is powered by a 12V DC—25 OV AC converter drawing from the 85-amp hour battery at the rate of 8 amps-per-hour. Batteries are recharged by two standard 20 amp Ford generators.

Below all this electrical equipment is a hand petrol pump for petrol stoves, refuelable without leaving the vehicle, an ammeter for the radios and tape recorder and a 0-20,000 ft. altimeter. A rev counter and car compass were the last instruments to be fitted.

Indianapolis:

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of three laps, these being in a cloud of smoke due to a broken cam cover holdown stud which permitted oil to pour on to the exhaust pipe.

Salih's three-year-old Belond AP Muffler Spl. had been renovated to the tune of approximately $7000. It was equipped with the latest air jacks, and as of race day morning still looked like a strong contender for a three-in-a-row hat trick. But the crew couldn't shake their jinx, as the machine did an about face and marched back to the tail end position.

Ingenuity is not dead at the Speedway. The Bowes Seal Fast team, and owner-driver Ray Crawford, showed up with machines utilizing running gear fabricated from titanium. The lightweight metal was supplied by the Union Carbide Co. to make rear end carrier plates, radius rods, and steering linkage pieces. Crawford went a step futher and had his front and rear axles made of titanium, thereby setting the stage for a story all its own.

The Pasadena pilot was sailing down the back stretch when, in his own words, "Something broke". He crashed into the Northeast turn retaining wall, then skidded to a stop in the middle of the track. Indeed, something did break, for the USAC observers posted on the wall at the spot said his front wheels seemed to collapse even before he got to the turn. A cursory examination of the front axle heightened suspicions the two remaining pieces simply pulled apart. The axle was shipped back to California in an effort to analyze whether the fracture was caused by hitting the wall, or whether the molecular grain of the metal just gave out. And it appears a little more experimentation may be in order before fabricating parts which are subjected to long periods of maximum strain from titanium.

One Meyer-Drake which was completely different from all the rest was the mill in Smokey Yunick's Reverse Torque Spl. Yunick reversed the rotational direction of the engine so the crank rotated counter-clockwise, his theory being the torque flow would go from the right rear wheel to the left, and would eliminate the tendency to unload the weight out of the left rear. Duane Carter placed the car in seventh despite two pit stops in which he killed the engine. But from all apparent observation of the machine's performance, there will be no mass migration to the land of turning the engine in the opposite direction.

Fortunately, the '59 show was without a fatal accident. The mandatory ruling on fireproof clothing saved Mike Magill and Crawford from burns. It also protected Dick Rathmann from injury when his McNamara Spl. caught fire during a pit stop. Magill's wreck looked like a repeat of the Pat O'Connor didoe of last year, as he got airborne going over Chuck Weyant and landed upside down in the infield. The compulsory roll bar did its work, however, and injuries were held to a chipped vertebrae.

Following the completion of the race, a protest made a recheck of the tape automatic. The recheck shuffled the eighth, ninth, and tenth places around, the positions going to Eddie Johnson, Paul Russo, and A. J. Foyt. Previously, only Foyt was listed in the first ten. Fourth, fifth, and sixth positions filled by Tony Bettenhausen, Paul Goldsmith, and Johnny Boyd stood pat on the re-run. Russo's chief mechanic, Fred De Orion, appealed the recheck, stating he believed they should be in sixth slot, but an audit by a local accounting firm still put the Bardahl Spl. in hole number nine.

In a contest where the lead changed 14 times between four different drivers, and where qualification speeds ranged from 145.908 to 141.215 mph, the oft-times heard complaint that all the cars are alike is not valid. True, the engines all were of the Meyer-Drake brand. And the chassis were constructed around the Indianapolis-roadster concept of race car design. But each individual entrant had his own ideas about setting up an engine and chassis, so that for all purposes there still were 33 different automobiles in the race.

The future holds in store great promise in respect to variations in the number of cylinders or methods of suspension. Even the European need not feel left out, because he has designs which, with modification, could be applicable to the Speedway. A displacement change is being discussed, and if an inter-Continental formula can be worked out, then racing enthusiasts can look forward to an entirely new era on American and European tracks. When this day arrives, Indy will play host to more different types of automobiles than it has at any time since the early days of its history.

—gm

The Eleventh Hour

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ered flag poised in a horizontal position. He saw a light blue Ferrari come screaming into view, but paid no attention to it until all of a sudden something clicked. He half-turned to another official who was standing beside him and the other man, realizing the situation in a flash, roughly whipped the flag, arm, and all, down, just as winner Trintignant flashed past with a stunned look on his face!

Of course, there are not many races which end as dramatically as this one. But sometimes the results upset logic and pick the plum right out of the leader's mouth just as he was about to bite on it.

In 1950 the all victorious Alfa Romeo 158 team was made up of Fangio, Farina and Fagioli (the FA-FA-FA team, they used to call it). Those were the years when the Alfettes won as they liked and where they liked. Accordingly, the two first-named won race after race, but third man Fagioli, a grizzled veteran already past his prime, never actually managed to pick up a first place, although he was often second or third. So when the Alfa-Romeo team sent Fangio and Fagioli to Pescara, it was decided to "give" Fagioli the race. This driver had had a long and glorious record of wins in Pescara with Auto-Union cars before the war, and so it was considered fitting that he should win at Pescara. Accordingly, Fagioli went off in the lead and Fangio tucked in behind him, for lap after lap, while behind them, once the race pattern settled down, was Louis Rosier with

his Talbot. I wonder how many SCI readers remember the wonderful drives by Rosier in the days of the 1500-4500 cc formula, when with his slow but reliable Talbot he challenged and frequently beat the rowdy, blaring 1500 cc cars?

Of course, it was one thing to beat Maseratis, E.R.A.'s and the early Ferraris, and another to beat the almost-mythical Alfettas. But Rosier was always in there pitching. The race droned on and on, and even those who clearly realized that the result had been "fixed", could not grudge Fagioli this day of glory. It had been so long since glory had come his way . . . Unfortunately, however, Lady Luck didn't want it that way. On the last lap of the lengthy Pescara circuit, the front suspension of Fagioli's car snapped and the wheel leaned in at a crazy angle. The finish can best be told in Fagioli's own words:—

"I felt the car suddenly heel over on its right-hand side, and, preoccupied as I was keeping the car on the road, I thought at first that a rim had broken. When I got speed down enough to have a look, I saw what had happened and realized that this race was over for me and that I'd better stop. Just then, however, Fangio came along, slowed down, saw what happened and by sign language urged me to go on. I tried. Of course, it wasn't very easy. I trundled down the Cappella slope and turned into the Montesilvano straight. This is where things really got tough, because the thing here was to get up as much speed as the suspension would stand, because we knew that Rosier was pounding along behind us and might turn up any minute. The wheel rolled round with great difficulty, and you can imagine that those moments weren't very pleasant, particularly when the wheel bearings seized up. However, I managed to drive the straight and all the time Fangio was beside me, encouraging me to keep trying. Then, after the Montesilvano straight, we turned into the finishing straight." This was the last lap, remember? "It was then that I can say that the most dramatic moment of my whole career went by. There we were, Fangio and I, painfully covering those last kilometers while every few seconds we turned round to look—was Rosier coming? Could I just make it? It was during the very last kilometer that I realized I'd lost it. We saw Rosier's Talbot come along and Fangio was obliged to go on ahead so as not to lose the race for Alfa-Romeo. I limped on and on and two hundred yards from the finish line, Rosier flashed past. As for the rest, everybody knows it. But it was very bad luck—don't you agree?"

This was as reported by the late Italian journalist Corrado Filippini. Poor old Fagioli never did get his last big chance, either. He wasn't on the Alfa team in 1951 and a year later, practicing for a sports-car race in Monte Carlo, smacked his Lancia against the side of the famous tunnel, and died of his injuries. (Not long afterwards, Rosier, too, was killed in a sports-car crash.) But it is easy to imagine the old man's heartbreak as victory went by like sand sifting out of his fingers, on this circuit of all places, where ten or twelve years before he had more than once been the center of a shouting, cheering mob.

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The Eleventh Hour

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And so the tale goes on. The story of the 1935 German Grand Prix, for instance, when Nuvolari won on the last lap after Brauchitsch's tires failed. You've probably heard this story told more than once, and in the telling there has been a lot of deserved hero-worship of Tazio Nuvolari and his fiery skill at the wheel. There is no doubt that Nuvolari won the race by sheer guts that day. But look at it from Brauchitsch's angle for a change!

During the opening laps he had been shuttling around between fourth and fifth place, then was passed by Chiron and, seconds afterwards, the Monégasque stopped at his pit and Brauchitsch again went past. Caracciola had led, then ran into trouble, and Nuvolari led from Brauchitsch. Then the Italian came in for that famous pitstop where everything went wrong.

This left von Brauchitsch with considerable time in hand, but it was then that Nuvolari began his famous battle. He steadily knocked seconds off the German's lead, then Neubauer signalled to von Brauchitsch to increase speed and this the driver managed to do; but still Nuvolari went faster and faster. Things then started to look grim for Mercedes; Stuck (Auto-Union) had just passed Caracciola into third place and Nuvolari was rapidly catching up on leader Brauchitsch. Then another factor entered the picture; tires. Brauchitsch's covers were clearly past their breaking point according to the meticulous charts prepared by the Stuttgart team. The laps went by and Brauchitsch was down to his breaker strip. Would the car hold out?

The answer, of course, is history. The off-side front cover blew only a few miles from the finish and Nuvolari triumphantly swept past to win one of the greatest races of his career—certainly the most famous. Of course, Tazio's driving was practically superhuman and surely no one deserved to win the race more than he—but, again, look at it from Brauchitsch's angle. IF the cover had held out a few miles more, he would have won the race. If Fagioli's suspension hadn't broken, or had broken a few hundred yards further on, or IF Rosier hadn't come along just then . . . The British say there are no ifs or buts in motor racing.

Few will ever forget the stark drama of Levegh's gallant failure in the 1952 Le Mans 24 hour race. At the start, Villoresi led with a 4.1-liter Ferrari, while the Jaguars all dropped out—remember the year they modified the front end and laid a king-size egg on the Sarthe circuit?—but then the Ferrari ran into trouble and the lead was taken over by the Manzon-Behra 2.3 Gordini; behind fought a mixed bag of Mercedes, Cunninghams and Ferraris. As twilight fell, Levegh (Talbot) came into the picture, hurtling along in sixth place.

Grey turned into dark blue as night fell and the lights went on, while Duane Carter's Cunningham slid into the infamous sandbanks of Tertre Rouge and the driver dug it out singlehandedly amidst applause, a Mercedes retired (this was the only time in history that a 1952-type 300SL retired due to mechanical failure!) and the Ferraris, too, were having an unhappy day. By midnight, the Gordini still screamed on and on but Levegh's Talbot had come up into second place, despite the fact that after eight hours' racing, the driver had not quit his seat except for routine stops. And, ominously enough, two silver Mercedes were third and fourth . . .

During the early hours of the morning mist swept across the circuit in ghostly drifts, but still Levegh kept on and on without relief. At the same time, however, the plucky little Gordini finally quit, with valve gear failure and brake trouble, so, with only twelve hours run and twelve more to go, "Pierre Levegh" (a nom-de-plume hiding his real name, Pierre Bouillin) raced on through the soft summer darkness with the big Talbot thundering along. The average never went much below 100 mph in spite of darkness and clinging mist, while the crowd stayed awake all night to cheer on the French car.

Morning came and the Talbot went round and round *and round*, while the sun grew first warm and then hot. The Talbot led by three laps from two Mercedes coupés, the rest nowhere. Now it was just a question of sitting it out. At mid-day the crowd broke out their lunch and the more cautious and race-wise of the spectators, began thinking about packing up early and getting their car out before the rush started. Tired journalists and pit mechanics yawned and rubbed their unshaven cheeks, reflecting that this had been one of the most boring races ever run. Then suddenly drama came storming through the oppressive heat of the cloudy, still afternoon. What happened was . . . "so . . . cruel that words can hardly be found for it". So wrote the late John Cooper of "The Autocar". "With not much more than one hour to go; with five laps in hand over his nearest rival; having driven single-handedly for almost twenty-four hours in splendid style, and after many years of racing with never a really big win, poor Pierre Levegh, forty-two-year-old Parisian garage proprietor, had the misfortune to run a big-end in the engine of his 4.5-litre Talbot near White House Corner. Could bad luck be carried further?"

Could it, indeed? As a staggered, broken Levegh stumbled into the pit area, Charles Faroux, the doyen of motoring journalists and founder of the Le Mans race thirty-five years ago, silently embraced him. There was nothing else left to do.

Three years later came the epilogue of this drama. Mercedes returned to Le Mans with their 300 SLR cars and one of them was offered to Levegh. What happened in that race will not quickly be forgotten; it was Levegh's car which plunged into the crowd and wiped out over 80 spectators on that tragic afternoon in June, 1955.

A year and a bit later this race—and a few months before Hawthorn's last-bend accident in Buenos Aires—Alberto Ascari was the protagonist of another similar incident. The 1953 Italian Grand Prix, the concluding race of the 2-litre Formula Two, was a really amazing affair. Four cars – Ascari, Farina, Fangio and

Marimón—screamed round and round the circuit for lap after lap, passing and repassing each other time and again, cornering nose-to-tail. Then Marimón had to stop because a stone broke his radiator, but when he restarted he quickly latched on again to the "flying wedge" and the old formation of four was made up again, although actually Marimón was several laps behind. Slipstreaming each other, leaving braking to the last minute, and ever watchful of each other, the four went round and round. A few laps from the end, Ascari managed to get ahead, although only by yards. While the crowd shouted and screamed in ecstatic anguish, the last lap came round with Ascari still in the lead. The flying wedge came into the last corner and the checkered flag was got ready for Ascari—then, on that last turn, he spun out! Marimón shunted him, Farina was forced to brake heavily and twitch his car over to avoid the melée, and Fangio hurtled through to win, almost as dazed as Trintignant was to be in Buenos Aires a few months later!

Monte-Carlo, the Millionaire's Playground, is traditionally associated with Onassis, the Casino and motor-racing. The relation between the last two frequently crops up. Such as over twenty years ago, when on two years running the leaders ran into trouble on the 98th lap and let the erstwhile second-placers into a surprise victory!

The first time was in 1931. At the start Borzacchini (2.6 Alfa) led briefly, but Varzi (2.3 Bugatti) and Nuvolari (2.6 Alfa) went into first and second places, and these two great drivers and bitter rivals went into a fierce battle, during which for lap after lap they were never more than a few yards apart, while Borzacchini, too, ran very closely behind them. At 20 laps Etancelin passed Borzacchini and started to press the two leaders, who were still locked in combat as they slithered and screeched round the circuit. However, by 30 laps Nuvolari had managed to get ahead and, try as he might, Varzi just couldn't get that extra bit of speed to get ahead again, although he roared along just yards behind Nuvolari.

At 70 laps, Etancelin retired while in third place. Varzi scraped ahead on lap 82 and then Nuvolari passed him again and the situation remained as before. Then Hartmann (Bugatti), running some laps behind, got in between Nuvolari and Varzi and slowed the latter up a bit, so it looked like a foregone conclusion for Nuvolari.

At 98 laps it happened. Varzi had by a desperate effort managed to come up right behind Nuvolari again when all of a sudden the leader's car caught fire. Enveloped in flames, the car plunged through the tunnel, while Nuvolari instantly climbed onto the cockpit and did his best to steer with his feet. Varzi went past again (of course he had immediately gone into the lead when Nuvolari slowed after flames broke out) and won, and amidst the cheers and shouts a chagrined Nuvolari tried to push the car to get it across the line, but some kibitzers joined the pushing party and Nuvolari was later disqualified for receiving outside assistance. A year later it happened again. Chiron (Alfa-

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The Eleventh Hour

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Romeo), driving on his home circuit, made a beautiful start and on the first lap already had a good lead. He began drawing away second by second, while Dreyfus (2.8 Bugatti), Varzi (2.6 Alfa-Romeo) and Etancelin (2.6 Maserati) scrapped behind him. Then Varzi stopped for a look at plugs and brakes, Lord Howe did likewise, and meanwhile Chiron, the debonair, was literally playing with the race. After a while he became fed up of "going slowly" and began to speed up. Behind him "the rest" desperately strived to do what they could. At 30 laps out of the traditional 100, Chiron led easily from Dreyfus, Etancelin and the gifted young Algerian, Guy Moll (Alfa-Romeo).

As the race wore on, there was little change, except that Etancelin took on Dreyfus for second place, and, after an interesting tussle, drew ahead. Chiron's 16-second lead fell to 10 seconds as he tired of playing around and settled back into his previous easy pace. However, even this easy pace sufficed to draw him further and further away from Etancelin. Moll passed Dreyfus into third and at 60 laps Chiron led by almost a minute from Etancelin with Moll and Dreyfus behind.

Two laps later Etancelin went into a corner too fast and slammed a sandbag. He was unhurt but the car's front suspension was damaged and he was obliged to retire.

Seventy laps came and went, with Chiron 1 min 30 seconds ahead of Moll, who had become second on Etancelin's retirement. 80 laps, no change. 90 laps, twenty minutes to go, no change.

The 96th lap came round, the 97th, and then, while Chiron was on his 99th lap, suddenly the Alfa went too fast on a tight corner and the car plunged into a sandbag. Stunned for an instant, Chiron struggled to get the car out, but as he did Moll flashed past and led the race. A lap later the young Algerian came in for his first big win — he was to be tragically killed in Pescara a year or two later — while Chiron, smiling bravely and outwardly as gay and debonair as ever, managed to collect second place, just ahead of the consistent Dreyfus.

The fifty-ninth minute of the eleventh hour . . .

—fbk

Wolfsburg Wildcat

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day were taken by dragster hot rods.

Two entrants in that contest almost refused to believe the Volks' times. They were driving fuel-injected Corvettes.

During the summer two stock car racing ovals in the Denver area woke up to the existence of sports car racing and decided to provide their customers with an exhibition of the sport. Eichhorn entered. Evidently, the word about the beige and brown bomber hadn't spread all around. Someone who presumed to know something about sports cars suggested the Volks had no business there because a VW just isn't a sports car.

The party let silence reign after Eichhorn turned in the fastest qualifying time around the one-fifth mile asphalt oval. This showing put him in last place in the inverted start system used for the 25-lap race. Yet he won it. Behind him at the finish were three Corvettes, two TR-3s, two Porsche normal 1,600s, an Alfa Romeo Giulietta Super, a pair of Austin-Healey 100-6s and a Jaguar XK-120.

Later, a similar exhibition was run on a one-third mile dirt oval at another track. Results: the same.

Last fall at the Fort Sumner, New Mexico races, he took second in the "F" modified class, running behind a Porsche 550 Spyder again. Placing third in class behind Eichhorn was another Spyder, which was considerably handicapped by having to finish the race on three cylinders. Fourth place in class was a 1,500 cc Porsche Super.

Since then, Eichhorn has made further modifications and refinements to this Wolfsburg wildcat. Development of the engine has progressed far enough that he's certain the Volks sedan body is preventing the engine from reaching its full potential. So for racing purposes, he is building a racing special which will carry a second Eichhorn engine in a basic VW chassis covered with a fiberglass body.

Meanwhile, the sedan will continue to be used—as it has been—for trips to the corner supermarket, to work and also rallies and vacation trips.

Eichhorn's first step on the hop-up road was a common one for VW owners. For a few thousand miles he ran the car with a supercharger installed. It didn't push the Volks enough like a Porsche, so Eichhorn turned elsewhere. He bought one of the then new Okrasa kits (two heads and twin carbs) and installed it. After an engine balancing job, he began to feel he was on the right track though just getting nicely started. At that time he also added a stabilizing bar to the front end and raised the rear trailing arms enough to give the rear wheels one-half-degree to one-degree negative camber with the car standing empty. Those modifications to the undercarriage made the VW handle like a sports car.

There followed a long list of engine modifications before the 1958 version of the car was complete.

He combined 7.5 to 1 Okrasa kit heads with high compression (7.5 to 1) VW pistons and a stroked (five millimeters) crankshaft. The resulting displacement worked out to 1,286 cubic centimeters. Compression checked out at 170½ pounds per cylinder in the rarified air of Denver's 5,280 feet of altitude. New and larger manifolds were made for the Okrasa heads which had routed ports. The head end of the Eichhorn-designed manifolds are twice the size of those supplied with the Okrasa kit. Five and a half pounds of metal were taken from the flywheel in one chop. A Porsche crankshaft pulley replaced the standard VW unit. A Porsche oil cooler was mounted. Other components added were an Iskenderian 2-J camshaft with aluminum gear, an Abarth muffler, a Bendix fuel pump under the back seat, matched springs and shims for the valve lifters, an oil filter (for extra cooling capacity, too) a VW Transporter clutch and a ball bearing throwout. For racing, he

made a set of balanced straight pipes.

In choosing components for this car, Eichhorn stuck to those readily available throughout the country. The 1958 version of the Eichhorn VW engine contained new components totaling about $582 including all costs of machine work such as balancing and chopping the flywheel. With labor charges added, he estimates the job could be done for about $750.

The 1958 car would go, but then its ultimate could only be plumbed after learning from experience with the transformed vehicle.

For example, Eichhorn carried over one minor though vitally important change derived from racing experience at Fort Sumner, New Mexico, in 1957. In his class race the Eichhorn VW and five other cars roared into a 90-degree corner in a pack. Figuring on superior cornering ability, Eichhorn waited until the last second to apply brakes, then hit them just short of locking wheels. Too late he realized his maneuver had put him ahead of the pack all right, but he was going faster than before despite the braking action. The beige and brown Volks shot off the course and executed a neat 540-degree turn before a surprised Eichhorn could get it under control. His size 12 brogan had simultaneously hit the brake pedal and the wide accelerator pedal he had installed over the stock VW roller system. Back home in Denver after the race, that wide accelerator pedal was trimmed in a hurry.

With spring and a racing season coming in 1958, Eichhorn wasn't satisfied with the car's performance at high rpm. In fourth gear, the engine would not climb above 4,300 rpm on the flat. Driving the car down a long, straight hill near Denver, he could pick up only another 300 rpm, or six miles an hour. He tried different timing, hotter and colder plugs, and new carb jet combinations. Still 4,300 rpm was the top fourth gear downhill figure. So the engine was torn down and all parts and clearances checked with a micrometer. Eichhorn found nothing, so he reassembled the engine, put it in the car and made another test. After some 40 hours of work and checking, the results were the same.

One day a friend remarked that perhaps an air cushion developed over the small VW grille in the 90- to 100-mph range and made the engine gasp for breath.

Eichhorn jerked off the engine compartment lid and went for another drive. The rpm figure on flat ground with the car in fourth gear jumped up to 4,600 rpm.

To provide a new air supply, he bought a pair of small chromed motor boat air scoops, cut holes in the sides of the car just above the rear fenders and mounted the scoops over the holes. Cool air is taken in by the scoops and routed directly to the air filters over the carbs. Then the engine compartment lid was also louvered to provide another outlet for heat.

The car was undercoated, Michelin "X" tires were mounted and a heavy duty battery was added.

The result weighed in at 1,760 pounds curb weight, several notches above the stock Volks curb weight of 1;660 pounds.

In this form the Eichhorn car has a top speed between 90 and 95 miles an hour and will cruise easily for hours at 85 miles an hour. Eichhorn uses a red line figure of 6,000 rpm on the engine although it has topped 6,500 rpm many times without ill effect. Once on a snap downshift, the tach showed 7,200 rpm and a bent valve stem resulted.

The major tuning problem is finding the right combination of carburetor jets for the particular driving job facing the car. The distributor set up remains the same as stock. Eichhorn has had best results using one step colder plug than would generally be used.

Besides its hot performance, the car has some other surprising features. On several cross country trips it has turned in mileage figures above 33 miles a gallon with cruising speeds from 60 to 80 miles an hour. One reading of 34.8 miles per gallon was turned over the rolling 115 miles between Canon City, Colorado and Denver. The modified engine also proved highly reliable. Eichhorn drove it 50,000 miles—a good number of them competition miles—before it was overhauled.

For the 1959 season, Eichhorn has developed an engine which works out to 1,368 cubic centimeters, and with the following combination of mods:

1. A Porsche 1600 normal crankshaft with throws ground to VW bearing size. This gives a 10-millimeter stroke over the stock VW unit.

2. Volkswagen connecting rods, machined in width to fit the Porsche crank and the rod's big end ground to clear the camshaft and opposing piston.

3. An Okrasa 7.5 to 1 compression kit, with ports adapted to take the largest size motorcycle valves available.

4. Stock VW 7.0 to 1 pistons, domed to fit the heads and cut away at the skirt to clear the crankshaft and opposing rods. (This combination gives a compression reading of 180 pounds in Denver's mile-high atmosphere.)

5. Crankcase breathing was abetted by modifying valve covers.

6. A Harman & Collins (EMPI) racing camshaft.

Mounted in the body of the special with standard VW gear and axle ratios, Eichhorn expects this engine—with other modifications which might be made as the need arises—to push his new competition special beyond the 120 mph.

The new engine is too much for use in a family sedan, even if it is still a push rod mill, Eichhorn says. The 1958 set of modifications, however, proved well that a man can have an honest-to-goodness four-passenger sports car that can win its class consistently if well driven and still not be a glutton for fuel. That's what comes of tapping the Volkswagen potential.

—hg & db

Coming Next Month

Royces That Raced

by Dennis May

Impressions Of The 1960 Corvette

by Karl Ludvigsen

VW The Hard Way

(Continued from page 45)

knee to the ground. This 2 by 2 was propped between the driver's seat and the brake pedal to hold the brake pedal in the depressed or stop position. Each wheel was then jacked up off the ground with the aid of an ordinary or non-bumper type jack, and spun. It was discovered that the brake drums are equipped with the same magic nut as the venerable Model "A" Ford. By turning the magic nut to a certain key position it was found that the wheel stopped, i.e. the brake was holding. In all other positions the wheel didn't stop, so it was necessary to find this trick position for each nut on each wheel. Although the adjustment was accurate enough for most purposes, it was found that even better equalization could be obtained by the simple expedient of turning the steering wheel slightly to the left or right, depending on which way the car tended to swerve when brakes were applied. Swinging the steering wheel while depressing the horn button also improves the electrical contacts in the horn circuit.

The unique design of the VW would have brought about a revolution in passenger comfort had it not been for the need to have a place to put the brake and clutch linkage. By putting the engine in the stern between the hind wheels it was no longer necessary for an automobile to have a tunnel through its middle for the transmission and drive shaft. However a place was needed to put the handbrake lever, the clutch linkage, the footbrake cables, the throttle cable, the choke cable, the heater cable, and the gear shift linkage, so the tunnel had to stay and even became the main structural member of the frame.

Once the brakes had been adjusted, it seemed logical to go to work on the clutch cable since it was apparently a similar problem in rigging. The frayed clutch cable was replaced by removing two bolts which hold the clutch pedal to the side of the tunnel, disconnecting the ends of the cable, and pulling the old cable out. Putting in a new cable was a more adventurous undertaking which will be much easier next time. The operation "may present certain difficulties" according to Hank Elfrink in his book on the VW. This understatement might be worded a little more correctly as being similar to threading a needle in the dark while standing on your head. This is also an understatement because it fails to mention the penalty or handicap for failure. Each time the cable is improperly threaded it snags on the hand brake linkage and can be extricated only with the aid of a size 10-C leather boot. Here again the proper German or indirect approach is to drill two 3/8-in. holes in the tunnel, then peer in one of them and hold a flashlight to the other to illuminate the interior of the tunnel. Once the cable is properly inserted it becomes a simple matter to adjust the clutch. A 9/16-in. box wrench is sawed off 1½-in. from the end, and with this device it is possible to reach up behind the rear axle between the bell housing, motor mount, heater box, main frame, and fan duct to tighten the adjusting nut. There is also a small lock nut which is supposed to be tightened to hold the adjusting nut in place, but since the size is unknown and tightening the nut would require sawing off a complete collection of small wrenches or a vernier caliper to a length of 1½-in., the project has been postponed until a later date.

After emergency repairs had been completed it was decided to undertake some performance tests. As can be seen from the chart, the 1947 VW lacks some of the refinements of more expensive automobiles. For instance, the shimmy in the front wheels was caused by a worn out wheel bearing. The bearing is the same as the front wheel bearing on a bicycle and is repaired in the same way. Acceleration was found to be inversely proportional to the amount of load in the car. Braking was found to be spasmodic even after repairs had been completed.

Extensive road tests over the hills and dales of Central Texas emphasized some of the characteristics of small sport cars which are apparent even in some of the most modern jobs. An encounter with a moderate size skunk became a near catastrophe. Head-on collisions should be avoided because the gasoline tank of the VW is in the driver's lap. An attempt to ford a small stream, a common maneuver in this part of the country, brought about unexpected problems. The blower which cools the engine picks up water and blasts it out through the defroster openings behind the windshield and under the driver's feet. The same thing happens on days which are both wet and cold, so it might be a good idea to equip the VW with double windshield wipers, inside and out. Parking the VW is no problem, except that parallel parking is out because of the bumpers. In many places the car can simply be parked on the sidewalk, since the police will assume that it was placed there by pranksters. It may be left safely in a tow away zone because there is no way that the vehicle can be lifted by a wrecker once the bumpers are removed. The bumpers must be removed in order to protect the fenders, and in order to do this the owner has to work up strong moral convictions that bumpers are sociologically wrong, since people should not go around bumping each other. Once over the philosophical hurdle, the actual removal takes only 15 minutes with the indispensable 9/16-in. wrench. Other items which are easily removed and disposed of are the rear seat, the sidewinding jack which comes with the car, the hub caps, inspection hole covers, and the trim strips on the running board.

No description of the VW would be complete without a few words about its remarkable engine which runs and runs on about a dollars worth of gas per week. Imagine a hole in the bottom of the trunk of your car, then imagine a small outboard motor suspended in space. If you were to then pick up your car and drop it neatly over the engine described, fastening it in with four bolts you would have a Volkswagen. You can make major repairs to the engine, transmission, or

differential on your front lawn, without any chain hoist or tools others than a handful of 9/16-in. wrenches. The engine is removed by sliding three old inner tubes, inflated, under the back end of the car. The four bolts are removed, the air is let out of the inner tubes, and the engine is dragged out from under the trunk. Once removed, the engine is best left alone, since it seems to run as long as it isn't tampered with. The transmission is similarly removed, but unfortunately it sometimes needs repairs. The selector forks get broken and need to be replaced. This is a simple matter because the transmission case is cast magnesium and opens up like a walnut shell with no gaskets or seals. The broken gears, forks, bearings, or what have you are simply replaced and the walnut shell bolted back together. The old gear oil can be reused unless it has chunks of iron in it. Any repairs which are more involved than overhauling the transmission should be left to experienced, factory trained mechanics. Minor repairs are easily performed by the novice, providing he keeps the indirect approach idea in the back of his mind.

The VW engine is provided with a fascinating device which makes it possible to start under any conditions. Behind the engine in the body panel which goes over the fence last is a small opening through which may be inserted a key or crank to turn the engine over by hand until it starts. (Newer VWs do not have this do-it-yourself 'starting feature.) The manufacturer has failed to exploit this unique invention in solving one of his most perplexing problems, where to put the battery. In Wehrmacht's VW's the battery had to be placed between the knees of the Commanding Officer, and now it is stuck under the passenger's seat in lieu of coil springs. By using the crank it is possible to do without the battery altogether, and decrease the 0-60 acceleration time to 16.5 seconds.

The performance of the 1947 VW leaves nothing to be desired, because driving it is great fun under any conditions. Maintenance is likewise sheer fascination if you are the type who likes to monkey with electric trains and Christmas tree lighting. If you are a connoisseur, the styling and appearance of the VW will appeal to you because, with the bumpers removed, the VW has all the succulent appearance of a wood duck with freshly plucked tailfeathers.

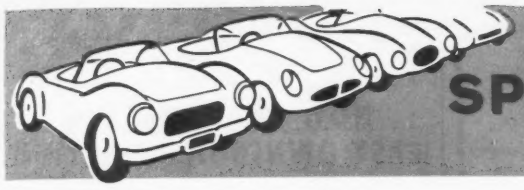
DATA

Price:	$240
Net Weight (stripped of fabric and trim)	1420 lb
Price per lb of metal	17¢

PERFORMANCE

Top Speed (4th) (shimmy was noted at 40 mph)	60 mph
Acceleration through gears:	
0-60 (With full fuel tank, seats installed, 3 passengers, and 1 boxer dog)	90 sec

—hbd



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SCI Club of the Year

(Continued from page 23)

their feature desks. And so it goes.

In a more serious vein there is the annual 1000 mile Rallye D'Endurance which draws over 100 entries from all sections of the midwest. For the SCCA, a thousand mile rallye is no simple feat of organization, and for an independent sports car club to put on this kind of event and run it smoothly year after year is phenomenal.

What about high speed competition?

Midwest has always held such speed events as hill climbs and auto crosses; but they have only recently entered into full-bore racing competition. In 1954, there was no racing in the club but people were beginning to discuss the prospect. It didn't get past the discussion stage until 1958 when conversation ceased and action commenced. It began with one willful member who got tired of all the talk and went into a "hand in the air" routine. A racing committee was formed, and six weeks later a driver's school was held with the largest turnout of novices ever experienced in the Middlewest. That was in September of 1958. Came the spring and Midwest's first race was held in June 1959. They raced until sundown, very successfully and without incident. At the end of the day, there were 23 newly-licensed drivers raring for more. And more they shall get, with as many races as feasible planned for the remainder of the season.

As with all their other activities, Midwest has entered into racing with a "let's make sense" attitude. After a rigid technical inspection, the cars are grouped in the "California" power-to-weight ratio system.

Where do they go from here?

The promotion of full scale driver's schools and races has opened a new future for the MSCC. At present, they are the only sports car club allowed to run, unsupervised by outsiders, at the Wilmot Hills course in Wisconsin. The club's aim in racing is for low-pressure, drive-it-to-the-course competition.

Though involved quite deeply in getting their racing program into action, the club will not skimp on its other activities. They plan to uphold the reputation of their Rallye D'Endurance and El Diablo rallies as two of the most important runs in the Middlewest, and consider their future obligation simply to satisfy member interest in all kinds of sports car activities.

Progress in the Midwest club is accomplished in an easy-going manner, with ample time devoted to careful planning and execution of activities. Theirs has never been a "bigger than ever this year" attitude and they plan to keep things that way.

A club, after all, is a spare-time proposition designed for divertissement and relaxing. When a club accomplishes this demeanor and provides a solid foundation to boot — well, occasionally rewards do come ther way, and SCI believe that they truly deserve to be called The Sports Car Club of the Year.

—sz

Riding on Air

(Continued from page 71)

skirt allowed obstacles as high as four inches to be crossed.) Though the engine was well muffled, the high tip speeds of the original prop caused undue noise in action.

Already under development when we saw the Air-Car was a new six-bladed fan to be driven through a 2½ to one reduction gear, the goal being more power and air and less noise. With this installed, clearances of from two to three inches were expected. Just below the prop or fan of the single-engined Air-Car is a radial array of curved vanes so placed that air forced against them tends to counteract the engine's torque reaction, relieving the other controls of this job. Below the engine only is a circular deflector plate to bounce air flow into the Air-Car's interior. A vertical divider down the longitudinal centerline was fitted in case there was any tendency for the vehicle to lose air pressure if it tilted to one side or the other, but the Air-Car was found to be inherently stable and this partition superfluous. It should be noted that until mid-'59 the Air-Car project was built beyond the pale of official Curtiss-Wright support and finance, necesistating the cheapest and most ingenous solutions to all problems. Now that the prototype has proved itself and the principle it seems likely that more generous support will be placed at the disposal of the project engineers.

On the basis of findings with the first Air-Car a brochure was prepared which outlined the capabilities of the machine and asked for specific recommendations for use and even orders from "qualified persons for off-highway use". The "off-highway" clause merely hints at the confusion that is likely to develop when various state and local bureaus begin vying for the right to license and tax the Air-Car and its relatives. Partially in response to suggestions made by potential customers a new version of the Air-Car was due to emerge from the experimental hangar for testing in the fall of 1959.

In the new vehicle torque problems are eliminated and safety enhanced by the use of two fan/engine units ahead of and behind the central passenger compartment, designed to accommodate four. The engines will be big (361 cu. in.) Lycoming fours, developing 180 bhp at 2700 and weighing 254 pounds apiece as against the 184 pounds of the original Continental powerplant. A total of over 300 horsepower will supply air to a single plenum chamber within the shell of the new Air-Car, which will measure 21 by 8 feet—dimensions chosen because they're the acceptable upper limit for a vehicle that might be used on the highway. Its T-Bird-styled sides enclose a ground area approximately the same as that of the first Air-Car, and it is expected to weigh 2800 pounds with four passengers and fuel on board. Approximately broadly, a pressure of ⅛ psi will be needed to support this heavier vehicle. The engines will be powerful enough to build up this pressure and feed enough air to maintain a static clearance of 11 inches as well. Its expected speed has already been outlined.

There's been no lack of ideas and suggestions for possible uses for machines of the Air-Car pattern. Their prime virtue is that they're quite indifferent to the type of surface beneath them, so long as it's smooth in relation to their operating clearances. One-foot waves, for example, are smooth so far as an Air-Car with 15-inch clearance is concerned. They are thus mobile over both land and water and in particular over marshy and swampy water where neither wheels nor propellers are comfortable, and over such difficult land as frozen muskeg or sand. Post office people would like to use them for deliveries to remote areas; rescue workers would find them invaluable in floods, etc.; they could speedily service offshore oil wells, and private individuals could put them to work on large and untracked grounds. C-W engineers have commented, by the way, that they don't feel wedded to the present propulsion system of the Air-Car, and that other drive methods might be adopted to suit special situations.

A side note, purely our own idea, is that the Air-Car might neatly solve the problem of adapting the gas turbine engine to small personal transportation equipment. The Air-Car's engine may operate at a constant speed, in contrast to the constant acceleration and deceleration demanded of an automobile engine, and has as its main task the passing of a large volume of air per unit time. With their high revs and critical blade contours turbines can be made most efficient at a single constant speed, and the huge quantities of air they devour could be an asset to an Air-Car instead of the disposal problem they create in a conventional car. High turbine power/weight ratios would augment the payload of the Air-Car as well. It's a possibility.

Possibilities, in fact, are far from lacking in the whole Air-Car story. If you have any questions or suggestions pertaining to this remarkable project you are urged to communicate them to Minard W. Stout, Vice President, Curtiss-Wright Corporation, 304 Valley Boulevard, Wood-Ridge, New Jersey. You can help C-W planners determine how much of a market there might be for an assembly-line Air-Car, and in that way bring one of these incredible machines closer to your own garage.

— *kl*

"Somebody really must have worked on this rally."

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